THE ENGINEERING AND MINING JOURNAL.

Vol. XII.—No. 17.—Fourth Series.] NEW YORK, TUESDAY, OCTOBER 24, 1871. [Single Copies 10 Cents.

Phosphor-Bronze.

A number of experiments have, recently, been made in Europe, on an alloy of copper, and tin containing phosphorus, to ascertain its hardness and tenacity in comparison with cast-steel. A recent number of the Houghton (Lake Superior) *Mining Gazette* contains quite a long article on the subject of these tests and the approval which the alloy is said to have obtained on the part of those who have used it.

They think that the general adoption of the alloy, in place of other metals, for ordnance and for certain other purposes for which cast-steel or even cast-iron is employed, would be highly advantageous to the parties using it, and also to the copper mines of Lake Superior.

The new alloy can, they say, be made tough as wrought-iron; its hardness, on the other hand, may be regulated to equal that of steel; its elasticity is great and holds out undiminished until rupture; its fluidity is such that the 20-inch gun and the clock-wheel may be cast with equal soundness, accuracy and perfection; its homogeneity is complete, its grain as fine as that of cast-steel.

According to a table showing the tenacity of various varieties of the new alloy, one specimen broke with a strain of 52,625 pounds to the square inch of section, while another showed an elastic resistance of 24,700 pounds to the inch.

They say that according to advice from Dr. Kunzel, dated April 26th, 1871, the Prussian government "has definitely and in principle, adopted the phosphor-bronze for the field artillery of the entire German empire;" but they are, we think, misinformed. The statement that cannon made of phosphor-bronze "will withstand the highest test to which the celebrated Krupp steel guns are subjected" is not, we believe, confirmed by the latest reports in the *Augsburger Zeitung*, which recently commented on the competitive trials.

We are informed also, that in order to test the adaptability of phosphor-bronze to such parts of machinery as are subjected to violent and sudden shocks, the cog-wheels of Messrs. Gilliaux & Co.'s heaviest iron rolling mill, which had hitherto been made of best cast-iron, and which broke down at least once a week, were replaced by phosphor-bronze gearing (weight about 8 cwt.), which has now been in continual use for more than ten months, and is yet in a perfect condition.

If this is so, and there seems to be no good reason to doubt the truth of the *Gazette's* statement, a wide field is open for phosphor-bronze, and we sincerely hope that it will so increase the demand for copper as to render possible the profitable working of many of our good copper mines, which are now lying idle.

The Carnival of Fire.

In the same week which saw the destruction of Chicago, the Northwestern states were desolated by a conflagration far more extensive and equally appalling, though its importance as measured in loss of money may be less overwhelming. More than a score of towns were destroyed, and thousands of square miles of forest were laid low, burying in their ruins the industry as well as the homes of an enterprising population, engaged in lumbering and farming.

We trust that this fearful calamity will arouse our people and our government to the necessity of more stringent protection of our timber lands. Fires in the woods, especially upon the public domain, are considered nobody's business. Every season for several years past, the vast interior continental basin has been clouded with smoke from the burning slopes of the Sierra and the Cascades. Over a hundred thousand square miles, the hazy air bears evidence of this annual destruction.

In the Rocky mountains, the case is scarcely less serious. One can scarcely penetrate a cañon so remote and solitary that it does not witness, in scathed and leafless forests, the carelessness or wantonness of the hunter and the miner. Even around the Yellowstone lake, in a locality unvisited by white men until within two years past, the numerous forest fires this year gave sad proof of our national recklessness. We do not think the Indians are open to this charge. So far as we have observed or learned they habitually make small camp-fires, and take the necessary precautions to prevent their spreading. They are too much interested in the preservation of game to do otherwise. But we have sometimes accidentally come into a deserted white man's camp, and found the fire still burning; and two conflagrations, at least, this summer, we had an opportunity of seeing, which were caused by parties of prospectors whose names were known to the inhabitants. This was in Montana, where there is a territorial law to punish such actions; but the law is a dead letter; and the wanton destruction goes on.

Another habitual occupation of the fire fiend in the West is the devouring of our mining towns, which are usually built as if to invite such disaster, and are, moreover, as a general rule, unprovided with fire engines and but scantily supplied with water.

A fortnight ago, the city of Helena, Montana, which has but just recovered from a former ruinous conflagration, was again visited in this way, and a large share of the business portion of the town was laid waste, including the quarters of our enterprising and lively brethren of the *Herald*, who, however, rising superior to such trifling accidents as utter destruction, continue without interruption the publication of their paper.

We have often wondered that in regions where, as all observers must agree, there is still plenty of room, the very earliest villages should huddle together in narrow cañons, as closely as if an over-populated neighborhood left them no choice. We have wondered why they do not all burn up annually, instead of about once in four or five years. We have wondered why a town like Helena, the "metropolis" of a territory, should not support one steam fire-engine—or hand engine—or at least a squirt-gun—in addition to the borrowed buckets which constitute at present its sole resource. The "wonders of the West" are numerous; and a few of them, like those we have enumerated, might be spared with benefit to the community.

Silver Smelting in Montana.

II.—THE WORKS AT ARGENTA.

The smelting works of Argenta, and especially those of S. H. Bohm & Co. are managed as well as can be expected in that locality. Bohm & Co. have had their two blastfurnaces and one cupelling hearth pretty regularly in blast since May, and Mr. Stapleton's works have also been in operation from time to time. The third works, those of the St. Louis Co., are idle, and have been so for several years.

All three are located a short distance above Argenta on the south bank of Rattlesnake Creek. The St. Louis Co's. works were, as I have remarked in a previous article, built first, at a time, when labor and all the materials for building were at the highest price. A natural tendency to save in the cost of materials is therefore everywhere visible and it is undoubtedly owing to this, that the external appearance of the furnaces and buildings is ungainly, rough and clumsy in the extreme. The works might, however, have answered the purpose very well, if the inner shape and dimensions of the blastfurnace had been suitable. But neither the wide hearth, nor its trapezoidal section could give good results with ores as quartzose as those of Argenta. And, furthermore, it appears from the burnt appearance of the inside of the furnace, from bottom to top, that the ore must have been charged into the furnace in large pieces and the smelting conducted with the flame blazing out of the top, two very serious mistakes which ought never to have happened. The slag too, on the dump, shows at once that smelting in reality was unsuccessful, whatever large amounts of silver may have been taken from the furnace during the short time of its running. A part of the slag contains very much lead, (and undoubtedly silver) while another part is not smelted at all, but was probably pulled out of the hearth with instruments. The German cupelling furnace, on the contrary, is a very good and substantial structure and must have done its work well. The establishment is not now in shape to be started up again with little cost, many important parts being entirely missing, and the whole having suffered much from exposure.

S. H. Bohm & Co's works, the old "Elsler furnace," are the next above the foregoing. They consisted, up to August of this year, of two stackfurnaces and a German cupelling furnace, the blast being supplied by a Root blower driven by a magnificent water-wheel of 12 ft. diameter and 4½ ft. breast. The latter supplies also the power for a Dodge crusher. Since August, a third blast furnace and another cupelling furnace have been added to the works. The blast furnaces are the high furnaces of the old style first introduced into this country for copper smelting at Ducktown, Tennessee. The inside height above the tuyeres is 20 feet, the section 24 x 24 inches from the top down to the hearth. The lining is granite from the neighborhood, which stands the heat about three weeks. There are two tuyeres in the back of each furnace, which lie horizontally about 10 inches above the lower end of the breast and have a diameter of about 1½ inches at the mouth. The hearth is filled with heavy *Stübbe*, made of charcoal-dust and burnt yellow clay, no

white clay being at hand in the neighborhood. This material is reported by the owners to stand very well.

A pressure of about 10 lines quicksilver is intended to be maintained in the blast. The charges vary of course considerably, as very different ores are constantly delivered from the mines, but it is intended, and the dump shows that the object is generally reached, to produce a slag ranking between a singulo- and a bi—silicate. Rather large amounts of iron-ore and limestone, both from the vicinity, are used for fluxing the great excess of quartzose gangue in the ores; and only from two to two and one-quarter tons of bullion are produced from each furnace per day. The charges contain from $80 to $150 silver per ton and the base bullion produced assays from $250 to $500. Specific statistics in this connection are wanting at present, but will be furnished later in the year.

The cupelling furnaces are exact copies of those used in the German lead and silver works. For the hearth, a very good marl is employed which is found in the limestone a short distance from Argenta.

Stapleton's works, a little higher up the creek, consist of two shaft-furnaces and one cupelling furnace, all constructed on the same plan as those just described. These works do not run quite as regularly as Bohm's, principally because the ore supply is precarious.

Such a cause has so far not affected Bohm's works; undoubtedly on account of the superior activity of the managers in securing ores from all quarters in advance, and the larger working capital at their disposal. The prices paid by both works for ore to miners are exceedingly moderate, and leave a large margin for profit, although the cost for smelting must necessarily be very high. Charcoal, for instance, costs from 18 to 20 cents per bushel, and labor from $4 to $6 per day, everything else being correspondingly high. The loss of silver in smelting is claimed by Mr. Bohm to be only from 8 to 10 per cent. of the assay-value, though there are no arrangements connected with the furnaces to condense the dust. This is quite possible, as no ores containing much antimony, arsenic, or zinc appear to come to the works.

The litharge produced in the cupelling furnaces is for the greater part not utilized at all at present, small quantities only being occasionally required for addition to the charges of the blast furnaces. The bulk of it lies in the furnace-yard, awaiting the time when it can be profitably reduced and shipped.

Much of the lead ores being carbonates, and such of the galena ores, as are fit for open heap-roasting being subjected to that process before smelting, there is only an inconsiderable quantity of matte produced, which, being at the same time poor in copper, is added to the charge without a preparatory roasting. It would, however, of course, be a better plan, to save the matte, until there is enough on hand to make a roast-heap; as in that case quite an amount of iron ore which must now be purchased at the works as flux, might be saved, and the silver and lead would be extracted at once. On the present method, the greater part of the matte passes the furnace many times almost unaltered.

The smelting works in Argenta will undoubtedly do well, if conducted as at present, as long as there is no competition, either from large amalgamating works, or from smelting works using the copper ores of Montana for the extraction of silver and gold. But it seems to me, that with either of these they would be unable to compete. A. Eilers.

Polytechnic Association of the American Institute.

Meeting held at their rooms, Oct. 12, 1871. The President (Prof. S. D. Tillman in the chair.)

The Polytechnic association resumed its weekly meetings, after the summer vacation, and was called to order at half past seven P. M. by the President.

The President (Prof. Tillman) delivered the following opening address:

Gentlemen of the Polytechnic Association: The presence of so many of those who have long been identified with the prosperity of this society at this our first autumnal meeting gives renewed assurance that our discussions of questions relating to applied science are deemed important, and that they are to be conducted with the same candor and acumen which have hitherto characterised our proceedings. Nearly seventeen years have elapsed since this branch of the American Institute commenced its sessions. At first its proceedings were wholly conversational, various improvements in the mechanic arts being the subjects which attracted most attention. In March 1859, while on the committee having charge of the organization, I proposed that greater latitude be given to discussion and to accomplish that end I offered a resolution that its name be changed from "the Mechanic Club" to "the Polytechnic Association" which was adopted. From that time Chemistry as well as Mechanics furnished topics for discussion, and the dignity of our proceedings has been raised by the frequent introduction of able and exhaustive papers on questions relating to abstract as well as applied science.

While it is admitted that the present plan of free discussion on every new topic or invention which may be introduced has resulted adventageously, there are many who believe that the influence of the Polytechnic would be greatly increased if a portion of each evening could be set apart for a lecture or a paper by some prominent scientist. It is therefore proposed that the Standing Committee of the Institute having charge of this organization select from a large number of names to be presented to them, lecturers for the coming season and that a programme of this course of weekly lectures be printed on cards to be distributed among the members of the Polytechnic and others who might thus be induced to become regular attendants.

As the monthly meetings of the Institute are held on Thursday evening it is proposed that the Polytechnic meet on some other evening so that its weekly sessions may be held without interruptions. In making this change the Standing Committee would doubtless be guided by the wishes of the Association.

During our recess I had the pleasure of attending the meeting of the American Association for the advancement of Science at Indianapolis in August. The attendance was large. Nearly one hundred papers were read. Some of the most important of these, when printed in full, will be presented for your examination. It will be gratifying to many here to learn that several members of this body bore prominent parts in the deliberations of the section devoted to Physics and Chemistry. From the pleasant recollection of that association whose highest aim is to ascertain the laws of the material universe, I turn with sadness to review the terrible consequences which have lately resulted from a disregard of some of those laws already well known.

On the 30th of July the "Westfield," a ferry boat plying between New York and Staten Island, was lying at her slip in this City filled with passengers and ready to start, when her boiler exploded, causing the death of one hundred human beings and the wounding of about as many more. The cause of this disaster I hope will be made the subject of your careful deliberation. No society has published more than this, on the subject of boiler explosion or done more by discussions to prevent the occurrence of such disaster. Your warnings against the danger of using weak or defective boilers must be many times repeated before the public are fully aroused to the importance of greater safeguards in the use of steam.

Another subject to which this association has devoted much attention is the danger to be apprehended from the use of those hydro-carbons, the products of oil wells, which vaporize at a very low degree of heat. Rumor says the upsetting of a petroleum lamp and the explosion of its contents among the combustible materials of a stable was the commencement of the most disastrous conflagration of which we have any record and which has resulted in the complete destruction of nearly all the business portion of the City of Chicago, involving her merchants in one common ruin and carrying its calamitous effects to almost every part of the commercial world. An unusual combination of causes tended to increase the area of that fire until it was beyond human control, and then was seen on the grandest and most terrific scale the operation of one of the simplest and best known chemical laws in the rapid combination of the oxygen of common air with combustibles already heated to the point of ignition.

In this enlightened age we do not connect the disasters resulting from the operation of natural laws with the sins of those who have suffered by such disaster, yet every injury which arises from a disregard of the immutable laws appertaining to matter should be received as a Divine admonition; and in the sad case alluded to the lesson taught us is that combustible materials cannot be used with safety in the construction of compact rows of dwellings, shops and warehouses. If buildings are brought into close proximity, safety from general conflagration can only be insured by the use of materials in their construction which are absolutely fire-proof. The discussion of this important question will doubtless be renewed in this society. In the meantime let us remember that although a violation of physical laws often involves us in evils, the laws are the dictates of infinite wisdom and obedience to them has rapidly developed the material greatness of our race.

A day in the Comstock lode.

Prof. James A. Whitney read a paper, an abstract of which will be found in another column.

Dr. Feuchtwanger—Our friend has given us a very glowing and graphic account of the silver mining in Nevada. I have been delighted with it, because it recalls to my memory what I witnessed in the same region eight years ago. But he has omitted to mention the fact that the matrix of this silver ore is white limestone, which looks like snow.

The thanks of the association were tendered to Prof. Whitney for his interesting paper.

It was announced that at the next meeting Dr. Feuchtwanger would read a paper upon Chromium.

Mr. Robert Weir read a paper on Tilghman's Sand Blast, which will be found elsewhere, in our present issue.

Mr. Weir exhibited specimens of work done by this process at the Fair of the American Institute.

Mr. J. R. Fisher inquired whether the process could be applied for drilling stone.

Mr. Weir stated that it could be used for splitting stone, by cutting a groove into which wedges could be driven.

Mr. Disturnell inquired whether it could be used for dividing masses of copper.

Mr. Weir—No, sir; it would cut a diamond sooner than copper. Copper is so soft that it is a good material for a template.

Dr. Feuchtwanger, conceding the fineness of the photograph etched by this process, said that he could do it equally well in a quarter of a minute by hydrofluoric acid.

Mr. Weir.—It took but six or eight seconds to do this, with a pressure of only about 2 ounces to the inch.

Mr. Fisher.—Can glass be depolished for windows by this process, economically?

Mr. Weir.—It is a very simple thing to do, but I do not know how much it would cost.

Mr. Disturnell.—I was in hopes this could be used for disintegrating copper, or dividing the masses, which is now done by a very expensive process. If human skill can invent any process for disintegrating those masses, it will be invaluable.

Mr. Weir.—The sand blast will not do it. It is resisted by indiarubber, paper, or anything soft or elastic.

Dr. Feuchtwanger.—It must be the sharp sand that is used.

Mr. WEIR.—It is river sand; and the sand is used over and over again. A quart of sand will last as long as the machine.

Mr. FISHER suggested its use in cutting marble or stone, cutting out the interior in useful forms. In tunneling, these forms cut out might pay part of the expense.

Mr. WEIR.—They are only experimenting with the process now. I see no reason why they should not be able to tunnel with it, if they can arrange the machine so as to draw off the sand when it has done its work. There is no difficulty about the cutting, for it will cut glass or trap rock quicker than steam will cut ice.

The PRESIDENT.—This seems to be one of the most important inventions lately brought before us. It acts upon the principle of giving the sand a high velocity. There is no sharpening or wasting of drills in this process. Another remarkable fact is that the very particles of waste matter taken off in cutting glass, are mixed with the sand and useful in cutting other glass.

Mr. DISTURNELL read a paper on the mines of Lake Superior.

He mentioned the abundance of vains carrying native copper on the South-shore of the Lake, from Ontonagon district on the west to Keweenaw Point and Portage Lake on the east. The iron ore deposits near Marquette, which are now very extensively worked, he said had produced 1.000.000 tons of ore this year. The extensive deposits of iron ore, lately discovered on the Menomonee river and another field in Ashland Co. Wisconsin, some twenty miles south of Lake Superior, were also very highly spoken of, the speaker claiming that the iron made from these ores surpassed the best swedish iron in tenacity.

The last discovery of great importance, that of the silver-vein on Silver Islet near Thunder Cape, was then mentioned. The vein in July last had been sunk upon to a depth of only 50 feet, yet 1,000,000 of treasure had been taken out of it. Other veins on Jerris Island in Thunder Bay were also highly spoken of. The whole shore line from the Pigeon river to St. Ignace Island was declared to abound in copper, lead, iron and precious stones.

This land can be purchased from the Canadian government for a dollar an acre in gold.

SUSPENSION BRIDGE.

Mr. BLANCHARD exhibited a model of a suspension bridge, intended to illustrate the strain upon the several parts; and explained its theory. He had tested the strain at different points by introducing a system of levers to measure it.

Adjourned.

A Day at the Comstock Lode.

BY JAMES A. WHITNEY.

THE following is an abstract of a paper read before the Polytechnic Association, in which the author sketched at length the incidents of a journey to Virginia City and Gold Hill, and described the operations of ore-getting, milling, retorting, etc.

The journey, twenty-one miles southward from Reno, on the Pacific Railway, is made by stage, and mostly in the night. Except for a short distance along the Truckee meadows, it is through an arid region, where nothing grows but clusters of sage-brush. This plant, which, when young, is of a silvery gray color, something like garden-sage, has a powerful, half-aromatic, and not unpleasant odor, which is very plainly perceptible in the still night air, and very strongly impresses itself upon the memory of the traveler. Virginia City and Gold Hill are the names given to the opposite ends of the settlement above the thus far developed portion of the ledge—Virginia City to the north and Gold Hill to the south. At the latter, among other mines, is located the Yellow Jacket, which furnishes a fine example of the silver mining enterprises of the locality, and the one to which principally the attention of the writer was directed. The shaft is eleven hundred and fifty feet in depth, driven vertically until it strikes the syenite underlying the lode, which latter has a "dip" of 45° toward the east. Standing twenty feet from the bottom of the shaft is the "incline," a tunnel which follows the dip to a distance equal to a further vertical depth of two hundred feet. In this incline is laid a track upon which runs a car holding about twenty-eight hundred-weight of ore, and moved up and down by a flat wire rope four inches in width and three-eighths of an inch in thickness. This rope extends up through the shaft to a nine-foot sheave in the roof of the building over the shaft, and thence to a winding drum fourteen feet in diameter, worked by an engine at the surface. As the car is drawn to the top of the incline, it is automatically dumped into a reservoir having a sloping bottom, with outlet chutes at its lowest part. Through these chutes the ore passes into iron ore-cars holding fourteen hundred-weight, which are run upon elevators or cages, and raised to the top of the shaft by wire-ropes running over sheaves to reels operated by a separate engine, in the same manner as that which works the car on the inclines. At the surface the cars are run from the cages out upon tracks laid on a trestle that projects horizontally from the hill-side, so that its outer end is fifty feet from the ground. At the outer end of this trestle are openings, through which the cars dump their contents into a receiver below, holding, when full, about 350 tons of ore. This receiver, like the small one just noted as being at the bottom of the shaft, has a sloping bottom, which causes the material to gravitate towards outlet chutes, through which, on occasion, it is transferred to freight cars of the railway, which convey it to the mills on the Carson river. Of course, the ore from the drifts or tunnels that extend directly from the shaft at different levels is put at once into the smaller cars, and then transported in the manner just described. These cars, in the drifts, move on tracks formed with miniature rails of the same pattern as those used in above-ground railways. The cars are formed with heavy sheet-metal bodies, and trucks having angle iron sides connected by wrought plates and by the axles of the wheels, which last are of cast iron. The cages differ in construction from those used in other mines of the district, in being made of skeleton form and of wrought iron, to secure lightness, their distinctive feature, however, being that they are made with two decks or floors, one above the other, so that two ore cars instead of only one may be raised at each hoist. It is proposed to secure a still further reduction of weight, both in cars and cages, by substituting steel for iron in their construction. The reel-shaft from which the cages are worked is fitted with an ingenious device that indicates the exact position of the cage at any portion of the shaft of the mine, and a rope extending up and down in the latter enables a person upon the cages to signal the attendants above to stop at any desired level. Similar adjuncts are provided in connection with the mechanism that actuates the car on the incline. In the lower levels the heat is intense, 110°, and the miners, mainly Cornishmen, work only from six to eight hours daily, for which they are paid $4 per day in gold. Of course, in order that operations may be continuous, different gangs work in the shafts alternately. The method of treating the wire rope upon which the hoisting depends, so as to protect it from corrosion and undue wear and tear, is probably the most efficient known. The ropes removed from their places, are wound each upon a drum about three feet in diameter, and arranged at one end of a trough twenty feet long, and half filled with melted tar, having mingled with it about five per cent. of tallow. The rope is wound from its drum, and, passing through the tarry material, is wound upon a second drum at the opposite end of the trough, being, as it passes through, scrubbed with a wire brush to detach the hardened coating previously applied. The ropes are treated in this manner once a month. The writer described the operation of the stamp-mills, amalgamators, retorting apparatus, etc., of a small milling establishment in the immediate neighborhood of the Yellow Jacket; and also sketched his general impressions of the locality, closing with appreciative remarks upon the bluff and cordial courtesy of all with whom he came in contact in the most noted mining camp of the remote West.

Tilghman's Sand Blast for Cutting Glass or Stone.*

BY ROBERT WEIR, C. E.

A new invention known as "Tilghman's Sand Blast" for cutting stone, glass, or any hard substances of such a nature, is now being exhibited at the American Institute Fair, and from its simplicity and quick action, this process will be sought after and applied to many purposes in engineering and the arts, which may not at first occur to our minds.

It may well be said, there is nothing new under the sun, when we see the marvelous results of Tilghman's process—for here has a man made use of one of nature's most common and constant actions in the way of lifting and driving the sand with the winds or waters, and wearing or cutting away the hardest substances. In this process the action of ages is merely concentrated by artificial means—and the wonder is, why has nature remained so long without imitators—in an action of elements against which constructors and engineers are forever fighting.

Mr. TILGHMAN first applied a jet of sand driven by high pressure steam to cut stone, but later experiments have proved that the work can be done with an air blast of lighter pressure, and excellent results have been obtained from a current of air caused by a fan blower.

The machine now exhibiting at the Fair consists of a hopper or elevated box, which is suplied with sand and a flexible blast pipe, for the air or steam. The sand which is supplied to the receiving hopper dry, is conveyed from thence through a flexible tube terminating into a smaller tube of metal, which passes through a larger chamber or tube through which the supply of air or steam is admitted. This part of the machine may be called the ejector, and is made of metal. The sand falling through the flexible tube into the smaller metal tube is carried about four inches past the entrance of the air blast; here the air blast tube is contracted and carried several inches further down, so that the sand falling through the inner tube is met by the blast of air or steam, and mingling with it, is driven forward from the nozzle, striking with great force against the surface to be cut.

The flexible sand and blast tubes allow motion and direction to be given to the nozzle, and thus the surface to be cut need not be limited. In the machine above described, an air blast is used with a pressure of from 70 to 75 lbs. per square inch, though this extreme pressure is not necessary for ordinary use, or to illustrate the perfect action of the invention.

A machine has been made to supply a blast of sand and air from a simple fan-wheel. A quart of sand can be thrown into this machine, and the surface to be frosted or cut is placed on a sliding table under the broad nozzle of the blast; the whole is then closed up and the fan revolved. The sand is drawn into the air current in the centre of the fan and forced up and around through the flat channel or nozzle against the surface to be cut; at the same time the table slowly moves across the blast, keeping the material about an inch from it. A few seconds of exposure will completely destroy the smooth surface of a sheet of glass and give it a beautiful frosted appearance; or if a design has been previously made upon the glass with paint, paper or thin gum cloth, all the interstices where the surface of the glass would be exposed will be cut, while the covered portion will be left untouched. The sand in the machine is used over and over again as fast as it has done its work, falling from the plate into the fan, and is kept constantly circulating. The pressure of this blast is not much more than two or three ounces to the square inch. A pattern or design, or stencil,

* Read before the Polytechnic Association of the American Institute.

as it may be called, is made of indiarubber cloth, or of paper, or the design may be painted on the surface to be cut; the sand striking these materials which are elastic, rebounds, while it cuts into the hard surface of the stone or glass. In many cases which were tried with the use of high-pressure steam or air, a cast-iron register front was used as a pattern; a plate of glass ⅜ of an inch thick and about 14 inches square was cut through in 14 minutes.

Woods of all kinds can also be cut or embossed, and for making large letters or type for printing, this process will be expeditious; the harder the wood the more perfectly does the material cut. It may readily be applied to the cutting out of coal; its effect on such a mineral would be like a jet of steam or hot water on ice, only to cut coal with the sand-blast would be far more economical than to fuse ice with steam. For cleaning or frosting silver this process will save much time and expense. For cleaning castings, and preparing metals for tinning or soldering, it is marvellously efficient. In its effect on glass almost anything can be accomplished, from the cutting of a fine engraving to the coarsest open scroll work; even steel cannot withstand its subtle action. In stone-cutting and ornamentation the process is invaluable, for, figuring or lettering in relief, the stone-cutter must exercise the greatest care and patience, while this machine will accomplish in half an hour what it now takes a man a week or ten days to do. Prof. Coleman Sellers has written a very interesting article on this process, which was published some months ago in the *Journal of the Franklin Institute*. He mentions many curious facts in regard to the action of the sand-blast on a variety of surface. To illustrate the extremes of its action, he states that, with a current of air of light velocity, very delicate materials, such as the green leaves of the fern, will resist the impinging of the sand long enough to allow of their outlines to be beautifully engraved on glass, and that the exposure can be so graduated that the thin parts of the leaves may be cut through, while the veins and branches of the leaves resist so that a fine shaded engraving of the leaf is made; while with a high velocity of steam, quartz sand will cut any substance harder than itself. With a jet of 300 lbs. pressure, a hole was cut through a piece of corundum, which is next to the diamond in hardness, 1½ inches in diameter and 1½ inches thick in 25 minutes. Where templates or patterns of metal are used, the blows of the impinging sand soon cause the metal to curl up as though under the blows of a planing hammer, even hardened steel being affected in this way. Fine lace will leave its design upon the surface of glass most perfectly, and the lace patterns cut in paper make excellent work.

In examining the action of the sand-blast upon the glass with a microscope, it is found to have a more uniform surface than is left by the rubbing or grinding process to accomplish the same end. At the point cut by the sand in the blast a reddish light is seen, caused probably by the crushing or cutting action of the sharp particles. It may be suggested that the dust from the cut materials will be very injurious to the workmen employed about the machines; but this can be easily obviated by using the sand and dust as in the smaller machines, or where a high-pressure blast is used, as is now in operation at the Fair, a fan blower can draw the spent material from the surface of the work and keep the stream constantly returning to the hopper.

Dualin.

Important experiments were made with this new explosive on Wednesday, October 11th, at the open cut of the New York and Boston railroad, about two miles east of Tarrytown, in this State.

A party of some sixty gentlemen, nearly all connected with mining, quarrying, or the construction of railroads, were invited by the Laflin & Rand Powder Company to witness the trials alluded to. The members of the firm acted the part of hosts and guides to the party very handsomely and with great liberality.

The steamboat "Florence," which had been chartered for the occasion, took on board the whole party, among which were several ladies, at the foot of Barclay street; and arrived at Tarrytown, after a three hours trip against the tide, at about three o'clock P. M. The weather was unfortunately not very favorable, a cold drizzling rain, which later in the afternoon changed to fierce torrents, alternating with short spells of hazy weather.

Immediately after their arrival at Tarrytown the visitors were conveyed in carriages to the spot selected for the experiments, where Mr. Dittman, the inventor of Dualin, was already in attendance. After witnessing the drilling of several holes in the country rock of the vicinity, a very hard, highly quartzose gneiss, by means of the Hotchkiss & Gardner steam drilling machine, the experiments with Dualin were commenced and all of them were carried through successfully, in spite of a heavy rain which grew worse every moment. It was intended to show:

1. The great power of Dualin as an explosive.
2. Comparative results obtained with equal weights of powder and Dualin.
3. Its non-explosiveness when ignited in an unconfined state by fire alone, without a fulminating cap.

All the rock in the open cuts is a dense gneiss, mostly very quartzose, but partly exhibiting joints across the stratification.

To show the enormous force of Dualin explosions, the first experiment was a grand blast directly at the face of the lower cut. For this purpose two holes of four inches diameter on top and tapering down to 2 inches at the bottom had been previously drilled with the machines above mentioned, to a depth of twenty one feet. The holes not being round at the bottom it was impossible to put in the charge of Dualin in cartridges, which was thought desirable as the holes contained water. It was therefore thrown loose into the water until about one third of the depth was filled. The cap and wires connected with a battery were then inserted and the holes tamped with sand. The position of the two holes was respectively 11 and 7 feet back of the face of the cut and the distance between the two was eighteen feet, four inches. The depth from the top of the rock to the bottom of the cut was eighteen feet, seven inches; there being, however, a lower terrace four feet out from the holes and four feet lower than the top-rock. The whole mass of the rock in front of the holes was probably not far from 2500 cubic feet or, taking the average specific gravity of gneiss at 2. 5, one hundred and ninety-two tons.

The charges of both holes were exploded at once. The report was not extraordinarily loud, nor were the rocks, with the exception of one large piece, thrown a great distance; but on inspection the whole mass was found to be thrown down and broken, only one of the fragments of rock retaining a size larger than two cubic feet. Everything else was broken into pieces small enough to handle with ease. And not alone the entire rock in front of the holes was thrown down and broken up, but back of one of them the blast had torn in clean to the bottom for a distance of 4 feet, the opening thus made being 8 feet wide in front and tapering back to about two feet.

Though it is evident that any amount of common powder charged into the holes could not have produced this effect, it must be regretted, that the amount of Dualin used was not previously weighed, as this alone would have given a fair idea of its effect.

The experiments made to show the comparative effect of common powder and Dualin, we regret to say, were not satisfactory, not because Dualin did not do what was expected of it, but because the elements of comparison were not fully furnished. It was, however, in all cases, evident that where powder broke boulders into large blocks, Dualin fairly ground them to small pieces.

The experiment showing both the great force of the explosion and the quick expansion of the gases developed was highly interesting. About two and one-half pounds of dualin were laid on top of a boulder 7+6+4½ feet. The cap and fuse were inserted and the dualin covered with a powder keg full of sand and a small flat stone. The report of this explosion was terrific; the stone laid on top was broken into a thousand fragments and thrown in all directions, and the boulder itself, though more than half of the force of the explosion was entirely lost, was cracked from top to bottom in two directions, while many smaller cracks were opened for some distance, though they did not cross the entire rock.

To show that dualin would not explode when unconfined, except when ignited by the explosion of a cap, a hole about 20 inches deep in one of the boulders was half filled with dualin and a common fuse was inserted. This was ignited without tamping the charge and when the fire reached the dualin, no explosion whatever took place, but the whole quantity burned out quietly with a brilliant white flame. For the same purpose a box containing about 10 lbs. of dualin was thrown into a bon-fire. Some time elapsed before the fire reached the dualin; and when it did so, the whole contents of the box were consumed in a short time emitting a strong white light, but without an explosion.

Experiments intended to be made, to show that dualin would not explode by ordinary concussion alone, without an exploder being applied to it, could not be made on account of the increasing rain and the fast settling darkness.

On the whole it must be said, that the trials which actually took place, spoke well for the new explosive. Its force is shown to be many times greater, than that of powder; but as we said before, it is to be regretted, that the exact comparative effect of the two explosives was not ascertained. That it is no more dangerous to handle, and in some respects even less so, than powder, was also shown to the satisfaction of all present.

During the return trip we overheard some of the gentlemen of the party discussing the advantages of applying dualin in coal mines. Many were strongly inclined to give dualin the preference before everything else. But it is our opinion, that in its application to this branch of mining, its advantages hardly over-balance its defects. Dualin explodes too quick, and crushes everything near the charge too fine to be used in coal mines; by its employment the waste, already enormous at present, would undoubtedly be greatly increased. In quartz mines, however, and in open air work it is undoubtedly in its place and promises to save both money and time. Its sudden and terrific energy indicates it, moreover, as a suitable material for torpedoes; and this application of it will be still more important, if it shall prove to be unaffected, even by long exposure to water

A New Bronze.

We learn from a recent copy of the *Polytechnisches Journal* that some investigators have succeeded in producing a new alloy which possesses peculiar advantages over others, for a number of processes in the arts. The peculiarity of the new compound consists in the fact that it contains phosphorus as an ingredient. The authors have not divulged the details of the plan by which they succeed in introducing this substance into combination. It is used with copper, or with copper and tin, either with or without the addition of zinc. The alloy produced is said to be peculiarly adapted for the construction of certain portions of machinery, as also for gun-barrels.

It seems, from an editorial note from Dr. Dingler, that the attempt to introduce phosphorus into the composition of several common alloys had been repeatedly made, but without success. The well-marked influence which its presence, in even trifling quantity, exerts upon the physical properties of irons, would seem to be the ground upon which the repeated efforts to utilize its presumable influence on other metals, is based; and there can be very little doubt but that the subject is worthy of the most careful attention of workers in metal.—*Journal of the Franklin Institute.*

THE COAL TRADE.

B. R. WESTERN, COAL EDITOR.

Anthracite Coals.

NEW YORK, Oct. 20, 1871.

WHOLESALE.—The demand is light, as is usually the case during the week prior to the Scranton Sale. There is some dissatisfaction at the present range of prices, many believing they are not warranted, except in the case of Lehigh Coal, which is in good demand and may be noted as somewhat scarce. What business has been doing has come mostly from the East, and the prices obtained have been the circular rates. We understand that city buyers are in want of coal, but are offering less than circular prices, with very few parties willing to sell. Out of town dealers are now striving to stock up prior to the close of navigation, which judging from the last few cold days and frosty nights promises, we think, to be early this season. We think we are justified in urging out of town buyers to take their coal at present prices; as the increased expenses of transportation, after close of navigation, will more than counterbalance any decline in prices that might take place in this city. The Pennsylvania Coal Company announce the following list of prices to contractors for November delivery: Lump, $5.10; Steamer, $5.10; Grate, $5.30; Egg, $5.40; Stove, $5.90; Chestnut, $5.10. It will be noticed that these rates are the same as last month's quotations, with the exception of Stove, which is advanced 10 cents. We regard these quotations as a fair index of the market and corroborate what we have noted above.

Elsewhere in our columns will be found the announcement of the ninety-fifth Scranton Auction sale: One hundred thousand tons are to be disposed of at the usual place of sale, No. 26 Exchange Place, at 12 o'clock on Wednesday next, Oct. 25th. It will be noticed that some 30,000 tons less are offered this month than were offered at the September sale for delivery in October. It is well that this is the case, for the market is scarcely strong enough to admit of more. We apprehend that about the same prices will be realized as at the last sale, namely: Lump, $4 15 to 4 27; Steamer, $4 47 to 4 50; Grate, $5 10 to 5 30; Egg, $5 25 to 5 47; Stove, $6 to 6 15; Chestnut, $4 62 to 4 76. Comparing these prices with the new Pittston quotations, they would seem a little high, but buyers most recollect that the former is for delivery at Newburg on the Hudson, which point is liable to be closed to navigation suddenly; furthermore, there is always a difference in favor of Elizabethport of about twenty cents in freight.

RETAIL.—There is a good trade doing. We quote company coals at from $6 50 to 7 50; special coals, $7 50 to 8 50.

FREIGHT.—Vessels are in fair supply. Boston, $1 90 to 2 00; New Haven, Bridgeport, $1 10; Norwich, Providence, $1 40; Harbor, 60 cents.

Anthracite Coal Trade for 1870 and 1871.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending Oct. 14, 1871, compared with week ending Oct. 15, 1870.

COMPANIES.	1870. WEEK.	1870. TOTAL.	1871. WEEK.	1871. TOTAL.
*Phila & Reading R.R.	95,862	2,372 552	102 592	3,034,500
Schuylkill Canal	26,621	365,442	31,013	816,788
Lehigh Valley R R.	54.834	2,457.261	72,147	1,758,105
Lehigh & Sus. R. R.	23,966	793.060	30,241	952.032
Lehigh Canal	28,521	539.199	29,804	541,741
Scranton North	10 751	592.467	20.245	397 593
" South	40 695	1,390 770	39 194	865.245
Penn. Coal Co., rail	24,581	909 486	27,031	543 722
" " " canal	355	14,4 0	598	11.182
Del. & Hud. Canal Co.	10,993	1,125,291	29.723	77 .382
" " East.	14.078	316 6 3	10 591	246. 11
" " West	1,684	66.290	3.6 0	85.895
South	2,292	357 769	9.778	239,384
Shamokin	11,079	379,742	12,864	505,460
Trevorton	....	67 374	....	
Lykens Valley Coal Co.	....	47,825	....	71,965
Wyoming South	....	238,824	....	
Wyoming North	....		....	4,167
P. N. Y. C. & R. R. Co.	4.403	241,894	....	104,987
Williamstown Co'y	6,983	2 7,952	....	
Big Lick Col	....	65,149	....	113,791
Total	363,716	12.629 450	419,471	11,065,030
1870		11,065.030	363,716	
Decrease		1,564,420		
Increase			55,755	

* Less coal transported for Co's use and Bituminous coal.

Lehigh Canal Coal Trade.

Shipped for the week ending October 13, 1871.

	WEEK. Tons. Cwt.	TOTAL. Tons. Cwt.
Total from Mauch Chunk Region	8782 11	200153 07
" " Beaver Meadow "	3001 15	47648 03
" " Treskow "	1366 19	21186 01
" " Mahanoy "	189 06	4415 13
" " Hazleton "	10334 05	147933 04
" " Upper Lehigh "	686 04	13484 19
" " Wyoming "	5442 11	108849 07
Total	29973 11	543720 14
Corresponding week last year	28521 07	569198 19
Increase	1282 04	
Decrease		45478 05

Bituminous Coal Trade, 1870 and 1871.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending Oct. 14, 1871, compared with week ending Oct. 15, 1870.

COMPANIES.	1870. Week.	1870. Year.	1871. Week.	1871. Year.
B. & O. Canal	4,506	417,543	16 111	553,366
C. & O. R. R.	21,673	666,011	23,010	972,277
H. & B. T. R. R.	5 961	244 051	5,946	252,941
Harrisburg & D.	14,921	614,755	16,625	627,972
*L. V. R. R.		10,943	8.310	315,508
P. & N.Y.C & R. Co.	6,631	205,019		
Cumberl'd Branch Canal	1,430	72.945	5, 631	162,714
" Railroad	2,798	92,746	1,199	66,463
Total	57,920	2,324,013	76,832	2,942,241
			57,920	2,324,013
Increase.			18,912	618,228

The tonnage of the P. & N. Y. C. & R. R. Co. is included in that of the L. V. R.R. Co

Philadelphia & Reading Railroad and Branches.

COAL TONNAGE

For the Week ending Saturday, October 14, 1871.

BY RAILROAD—ANTHRACITE.

	Tons. Cwt
PASSING OVER MAIN LINE AND LEB. VAL. BRANCH.	
From St. Clair	36,034 03
" Port Carbon	6,564 06
" Pottsville	2,301 08
" Schuylkill Haven	31 921 17
" Pine Grove	5,951 18
" Tamaqua	16,923 05
" Harrisburg	
" Dauphin	6,237 03
Total	105,934 00
FOR SHIPMENT BY CANAL.	
Passing Frackville Scales	8,414 00
" Mill Creek "	1,598 09
" Schuylkill Valley Scales	1,617 13
" Mt. Carbon "	1,504 05
" Cressona "	13,262 13
" Pine Grove "	
" Tamaqua "	3,375 09
Total	29,772 09
SHIPPED WESTWARD VIA NORTHERN CENTRAL RAILROAD.	
Passing Locust Gap	770 00
" Shamokin	3,990 13
" Herndon	
Total	4,760 13
SHIPPED WEST OR SOUTH FROM PINE GROVE.	
Via Schuylkill & Susquehanna R. R.	1,464 07
" Lebanon & Pine Grove Branch	920 08
Total	2,384 15
CONSUMED ON LATERALS.	
From Frackville Scales	765 03
" Mill Creek "	453 07
" Sch ylkill Valley Scales	241 00
" Mt. Carbon "	866 17
" Cressona "	388 11
" Pine Grove "	270 06
" Tamaqua "	380 18
Total	3,366 02
LEHIGH AND WYOMING COAL.	
Received via Allentown, E. Penn'a Br.	195 08
" " Alburtis, " "	30 07
" " Oreland, G. & N. Br.	1,380 04
" " Connecting R. R.	
" " Willow Street R. R.	224 01
Total	1,830 00
BITUMINOUS.	
From Harrisburg	10,388 14
" Connecting R. R., G. & N. Br.	
" Junction R. R.	118 00
Total	10,506 14
COAL FOR COMPANY'S USE.	
Anthracite	2 803 02
Bituminous	276 02
Total.	3,079 04

RECAPITULATION.

	Total for Week.	Corresponding week last Year.	
Passing over Main Line and Leb. Val Branch	105 934 00	98,668 19	i 7,265 01
For Shipment by Canal	29,772 09	25,932 14	i 3,839 15
Shipped Westward via Northern Central R R.	4,761 13	4,235 06	i 525 07
Shipped West or South from Pine Grove	2,384 15	1,150 10	i 1.234 05
Consumed on Laterals	3, 366 02	2,955 06	i 410 16
Lehigh and Wyoming Coal	1,830 00	121 09	i 1,7.8 11
Total Anthracite paying fr'gt	149 047 19	133,064 04	i 14,983 15
Bituminous	10,506 14	8,804 15	i 1,701 19
Total of all kinds paying fr'gt	158,554 13	141,868 19	i 16,685 14
Coal for Company's use	3,079 04	3,991 11	d 912 07
Total Tonnage for Week	161,633 17	145.860 10	i 15 773 07
Since Dec. 1, 1870	4,7.9536 00	3o60181 15	i1209354 0
Total to date	4 9311o9 17	3706 42 05	i12251 7 12

SHIPPED BY CANAL.

	Total for Week.	Corresponding week last Year.	
From Schuylkill Haven	27.342 10	25,906 00	i 1,436 10
" Port Clinton	3,671 00	1,351 0	i 2 320 00
Total Tonnage per Week	31 013 10	27 257 00	i 3,7 6 10
Since Dec. 1, 1870	785 774 07	344 891 01	i 440883 06
Total to date	816,787 17	372,148 01	i 444639 16

Pennsylvania Coal Company.

Shipments of Pittston Coal for the week ending Oct. 14, 1871.

	1871. WEEK.	1871. YEAR.	1870. WEEK.	1870. YEAR.
By Railway	27,030 19	542.722 05	24,5-0 03	909,486 00
" Canal	598 10	11,182 06	354 14	14 469 16
Total	27.629 09	5-4,904 12	24,934 17	923,955 16
Decrease 1871, 369.051 04				

Report of Coal Transported over Central R.R. of N. J. (Lehigh and Sus. Div.)

Week ending Oct. 14—Compared with same time last year.

WHERE SHIPPED FROM	WEEK 1871.. tons ct	WEEK 1870 tons ct.	YEAR 1871 tons cwt.	YEAR 1870. tons. cwt.
Wyoming Region	30765 03	26542 09	978861 18	966745 12
Upper Lehigh Region	3888 07	3428 06	69055 12	119338 03
Beaver Meadow Region				
Hazleton Region	10305 08	8752 00	150198 01	251646 07
Mahanoy Region				
Treskow Region	2935 11		52102 08	
Mauch Chunk Region	6359 11	4920 01	162438 01	82391 13
Totals	54454 00	43642 16	1412656 00	1414121 15
Increase	10811 04			
Decrease			1465 15	
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	30241 09	23985 13	952032 05	793059 14
Forwarded East of Mch Chunk by Canal		15116 01	311839 17	409972 12
Delivered at and above Mauch Chunk	18142 12			
Delivered to L. & B. R. R. at Plymouth Bridge	3082 01	1198 17	49374 11	34571 10
L. V. R. R at Packer'n	2505 04	2956 06	73693 12	156362 01
	482 14	385 19	25715 15	20155 18
Totals	54454 00	43642 16	1412653 00	1414121 15
Of the above there was transported on acc'tn of L. C. & I. Co.	10914 13	7071 11	238633 19	113390 11
W.-B. C. & I. Co.	16635 11	15524 10	684315 13	466276 15
Totals	27570 04	22596 01	902949 12	579667 06
Increase	4974 03		323282 06	
Decrease				

Philadelphia and Reading R. R.

Amount of coal transported on the Philadelphia and Reading Railroad during the week ending Saturday, Oct. 14, 1871:

	tons. cwt
From St. Clair	36,034 03
" Port Carbon	6,564 06
" Pottsville	2,301 08
" Schuylkill Haven	31,921 17
" Auburn	8,621 04
" Port Clinton	16,923 05
" Allentown and Alburtis	225 15
" Harrisburgh and Dauphin	16 625 17
Total paying freight	119,217 15
Coal for Company's use	3,039 06
Total for week	122.257 01
Previously this year	3,596.713 06
Total	3,718,970 06
To same time last year	3,044,976 17

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for week ending Oct 14, 1871, previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL. Tons. Cwt
Total Wyoming	18,012 01	464,541 14
" Hazleton	51,863 18	1,006,748 05
" Upper Lehigh	50 12	1.794 11
" Beaver Meadow	17,120 04	365,424 08
" Mahanoy	12,075 12	424.054 15
" Mauch Chunk	45 12	7,164 15
" Sullivan & Erie	620 18	3,752 09
Total Anthracite	99.788 18	2,272,980 17
Bituminous Coal from all sources	8,309 12	316,508 10
Total by rail and canal	108,098 10	2,589,489 07
Same time last year	74,092 17	3,138,214 15
Increase	34,005 13	
Decrease		548,725 08
Forwarded East from Mauch Chunk by rail	72,147 10	1,758,105 04
Same time last year	54,833 13	2,457,261 04
Increase	17,313 17	
Decrease		699,156 00

RECAPITULATION.

Forwarded East from Mauch Chunk by rail	72,147 10	1,758,105 04
To N. C. R. R., at Mount Carmel		4,290 06
Forwarded North from L. & B. Junction	12,116 12	246 045 02
To L. & S. R. R. at Packerton for rail	268 00	5,558 09
Delivered at M'h Chunk	26 18	1,047 07
Delivered on line of road above Mauch Chunk	505 13	9,307 04
Delivered above Mauch Chunk for use of L. V. R. R.	1,301 14	41,512 16
To L. & S. R. R., at Penn Hav., for railroad		94 10
Do for canal	10,223 10	151 596 16
At M Chunk for canal	3,191 01	55,4 3 01
Total Anthracite	99.788 18	2 272,980 17
Bituminous Coal	8,309 12	316.508 10
Total all kinds	108,098 10	2,589,489 07

This report includes all Bituminous Coal carried over the Lehigh Valley and P. & N. Y. Railroads from December 1st, 1870, to date.

Delaware and Hudson Canal Company.

The following is a statement of Coal Transported by the Delaware and Hudson Canal Co. for the week ending Oct. 14, 1871.

	FOR THE WEEK.	FOR THE SEASON.
By Delaware and Hudson Canal,	24,723	770,382
By Railroad, East	10,591	246 111
" " West	3,650	85 895
" " South	9,778	239 8 4
Total Tons	53,742	1,341,772
For the same period last year.		
	FOR THE WEEK.	FOR THE SEASON.
By Delaware and Hudson Canal,	10,993	1,125 291
By Railroad, East	14,078	3 6.633
" " West	1,684	66,290
" " South	8,292	357,769
Total Tons	35,047	1,865 984
Decrease		

Delaware Lackawanna & Western Rail Road Company.

Coal transported on the Delaware, Lackawanna and Western R. R. for week ending October 14, 1871.

	Week. Tons. Cwt.	Year. Tons. Cwt.
Shipped North	20,244 19	397,592 17
Shipped South	39,194 10	865,245 07
Total	59,439 09	1,262,838 04
For the corresponding time last year:		
Shipped North	10,751 06	592,667 01
Shipped South	40,694 16	1,390,770 06
Total	51,446 02	1,983,437 07
Increase	7,983 07	
Decrease		720,597 03

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company for the week ending Saturday, Oct 14, 1871.

	WEEK.	SEASON.
North	50,325 06	1112,898 01
South	9,778 09	239,384 11
Total	60,103 15	1352,282 12
Corresponding time in 1870:		
North	20,511 09	1,689,420 08
South	8,292 15	357,769 04
Total	28,804 04	2,047,189 12
Increase North		
Decrease South		
Total increase 1871	31,299 11	
Total decrease 1871		694,907 00

Schuylkill Canal.

Report of coal transported over the Schuylkill Canal for the week ending Saturday, Oct 14, 1871.

	Tons. Cwt.
From Port Carbon	— —
" Pottsville	— —
" Schuylkill Haven	27,342 10
" Port Clinton	3,671 00
Total for week	31,013 10
Previously this year	785,774 07
Total	816,787 17
To same time last year	566,442 01

Statement of Coal Transported over Cumberland and Pennsylvania Railroad

During the week ending Saturday Oct. 14, and during the year 1871, compared with the corresponding period of 1870.

WEEK.

	To C. & O. Canal Tons. Cwt.	To B. & O. R. R. Co. Tons. Cwt	Total. Tons Cwt.
1871	16,111 11	23,010 09	39,122 00
1870	4,606 09	21,673 06	26,179 15
Increase	11,605 02	1,337 03	12,942 05
Decrease			

YEAR.

1871	553,366 06	972,277 04	1,525,643 10
1870	417,543 09	666,011 05	1,083,554 14
Increase	135,822 17	306,265 19	1 442 088 16
Decrease			

Cumberland Branch

WEEK.

	To C. & O. Canal. Tons. Cwt.	To B. & O. R. R. Co Tons Cwt.	Total. Tons Cwt.
1871	5,630 13	1,199 00	6,829 13
1870	1,429 16	2,797 17	4,227 13
Increase	4,200 17		2.602 00
Decrease		1,598 17	

YEAR.

1871	162,713 16	56,462 15	219,176 11
1870	72,945 03	92,745 16	165,690 19
Increase	89,768 13		53,485 12
Decrease		36,283 01	

Huntington and Broad Top R. R. Co.

For week ending Oct. 14, 1871	5,946 tons.
Same time last year	5,961 "
Increase	
Decrease	15 "
Total amount shipped to date	252,941 "
Same time last year	244,051 "
Increase	8,890 "
Decrease	

Shamokin Coal Trade.

For week ending October 14, 1871	12,863 19
Same time last year	11,078 15
Increase	1785 04
Decrease	
Total amount shipped to date	505,465 10
Same time last year	379,741 14
Increase	125,723 16
Decrease	

Line Prices for Coal Oct, 1871,

	Lump	Broken	Egg	Stove	Ches'.
At Mauch Chunk	4.00	4.00	4.00	4.25	3.00
" Wilkesbarre	3 75	3.75	3.75	4.00	3.90

Company Coals.

Oct, 1871.

	L.	Str.	Gra.	Eg.	Sto.	Chest
*Scranton at E. Port	— —	— —	— —	— —	— —	— —
*Pittston at Newburgh	5 10	5 10	5 30	5 40	5 80	5 10
*Lackawana at Rond't	5 10	5 10	5 30	5 60	5 95	5 10
Wilk'b're at Hoboken	4 65	4 75	5 75	5 75	6 25	5 25
Old Co. Lehigh at Pt. John'n	6 25	6 25	6 25	6 25	6 50	5 50
Lehigh at Eliz. Port	6 25	6 25	6 25	6 25	6 50	8 50

For freights to different points see "Freights."

* To contractors.
* None to sell.

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

	AT NEW YORK, Oct. 1. R. A.	W. A.	AT PHILADELPHIA, Oct. 1. R. A.	W. A.
SCHUYLKILL.				
Lump	— —	— —	— —	— —
Steamer	6 00	— —	— —	4 50
Broken	6 00	— —	— —	— —
Egg	— —	— —	5 00	4 75
Stove	6 25	— —	5 00	5 00
Chestnut	5 00	— —	— —	— —
Pea	— —	— —	— —	— —
LEHIGH.				
Lump, (along side)	6 50	— —	— —	— —
Broken	6 50	— —	— —	— —
Egg	6 50	— —	— —	— —
Stove	6 50	— —	— —	— —
Chestnut	5 50	— —	— —	— —
Pea	— —	— —	— —	— —
SPECIAL COALS.*				
Diamond Vein	R. A. 6 00@6 25		— —	— —
New England	"	—	— —	— —
Locust Mountain	W. A.	6 50	— —	— —
Honey Brook, Le'h	W. A.	5 50@6 25	— —	— —
Spring Mountain	" "	5 50@6 25	— —	— —
Sugar Creek	" "	5 50@6 25	— —	— —
Sugar Loaf	" "	5 50@6 25	— —	— —
Old Comp'y's	" "	5 50@6 25	— —	— —
Cross Creek	" "	5 50@6 25	— —	— —
Room Run	"	5 50@6 25	— —	— —
Girardville	" "	—	— —	— —
McMichael	" "	— —	— —	— —
Shamokin	" "	5 25	— —	— —
Lykens Valley	" "	5 75	— —	— —
Broad Top	" "	5 25	— —	— —
Hill & Harris	" "	— —	— —	— —
Henry Clay	" "	— —	— —	— —
Powelton	"	5 25	— —	— —

*Dealers in these coals may be found in our advertising columns

Prices at Baltimore—Oct, 1871.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$5 60@5 85
Pittston and Plymouth, do	— —@5 60
Shamokin Red or White Ash, do	— —@5 60
Lykens Valley Red Ash, do	— —@6 30
Zerba Valley	— —@— —
Treverton	— —@— —
By retail, all kinds per ton of 2240 lbs	7 00@8 25
Georges Creek & Cumberland f. o. b. at Locust Point for cargoes	— —@4 75
Fairmount and Clarksburg gas, f. c. b. at L. Point	6 00@6 50
BITUMINOUS COALS.	
Kittaning Coal Co.'s Phœnix Vein, f. o. b. at Phila	$ —
Lemon " " "	—
Cumberland Vein Coal	—
Consolidation Coal Co.'s on board N. Y.	6 75
Maryland Coal Co. " "	6 75

Prices at Georget'n, D.C., & Alexandria, Va.

Oct, 1871.

George's Creek and Cumberland f. o. b. for shipping... $4 35@4 50

Prices at Havre de Grace, Md.

Wilkesbarre and other White Ash for cargoes	$5 25@5 50
Lykens Valley	6 25@6 50
Shamokin Red or White Ash	5 50@5 75
Trevorton and Zerba Valley	— —@—

Prices of Gas Coals.

Oct, 1871.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr., 41-43 Pine st., N. Y

	Duty, $1 25, gold. Coarse	Slack.
Block House	$1 75 @-1 75	
Gowrie	1 75 @-1 75	

Corrected by Bird, Perkins & Job, 86 South street.

	Coarse.	Culm of Coal
Pictou	$2 25 @1 25	
Sydney	2 25 @- 80	
Lingan	1 60 @- 80	
Little Glace Bay	1 60 @1 00	
Caledonia	1 60 @- 80	

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty $1 25 per ton, gold, on the coarse coal. 25 per cent. ad valorem on the Culm of Coal.

AMERICAN.

	Currency.
Westmoreland	$7 00 @- —
Fairmount Gas Coal Co. of N. Y.	7 00 @- —
Despard Coal Co	7 00 @- —
Penn	7 00 @- —
Newburg Orrel Gas	— — @- —
West Fairmount Gas Coal	7 00 @- —

AT PHILADELPHIA.

Powelton	$6 75

TO NEW YORK.

Provincial.	
Sidney	$3 25
Lingan	3 25
Cow Bay	3 37½
Port Caledonia	3 37½
Little Glace Bay	3 25

Prices of Foreign Coals.

Oct, 1871.

Duty $1 25 per ton.

Corrected weekly by PARMELE BROS., No 32 Pine street, N. Y.

Liverpool Gas Caking	$ 8 00@— —
" " Cannel	10 50@12 00
" House "	— —@16 00
" Orrel	12 00@14 00

Per ton 2,240 lbs., ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$16 00@17 50
"Cannel, "	18 00@20 00

Per ton 2,000 lbs. delivered.

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven for consumption	$2 10
For reshipment	2 00

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Phillipsburgh	$0 92
C. R. R., N. J., Phillipsburgh to Elizabethport	1 88
Shipping expenses at Elizabethport	25
Wharfage	10
Total	$2 15

MAUCH CHUNK TO PORT JOHNSON.

L. V. R.R., or L. & S. R.R. from M. C. to Phillipsb'g	$0 92
C. R. R., of N. J., Phillipsburgh to Pt. Johnson	1 88
Shipping expenses	25
Wharfage	10
Total	$2 15

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Phillipsburgh	$ 92
Morris & Essex R. R. Phillipsburgh to Hoboken	1 88
Shipping expenses	20
Warfage	16
Total	$2 15

TO SOUTH AMBOY.

L. V. R. R.	92
B. & D. R. R. / Cam. & Am. R. R.	1 81
Shipping Expenses	35
Total	$2 08

PENN HAVEN TO ELIZABETHPORT.

L. V. R R Penn Haven to Phillipsburgh	90
C. RR. of N. J. Phillipsburgh to Elizabethport	126
Shipping expenses	25
Wharfage	10
Total	$ 2 51

BY CANAL.

Via Schuylkill Canal.

TO PHILADELPHIA.

From Schuylkill Haven..Toll..$1.35 Freight..95c	$2 30
" Port Carbon	
" Port Clinton..... " 1.88 " 55c	2 23

Drawback 15 cents during August.

NEW YORK.

From Schuylkill Haven .. Toll..1 10 Freight..$2 00..$3 10

The Rates of Toll on Lump and Steamer Coal will be ten per cent less than the above rates. The charge will be per ton of 2240 lbs. No charge less than Forty Cents per ton will be made for any distance. A drawback of thirty cents is allowed on all coal passing Fairmount Locks used at Philadelphia and vicinity.

Via Lehigh Canal.

TO PHILADELPHIA

Lehigh Canal	$ 80
Freight and towage	1 10
Total	$1 90

TO NEW YORK.

Lehigh Canal	$1 57
Morris Canal / Freight / Towing	208
Total	$2 65

TO JERSEY CITY.

Lehigh Canal	$ 44
Morris Canal / Freight	2 06
For re-shipment	2 50

Via Delaware and Raritan Canal.

TO NEW YORK.

LehighrCanal	$ 57
Delaware Division Canal	38
Delaware and Raritan Canal	
Freight	1 25
Towage	20
Total	$2 6

TO NEW BRUNSWICK.

Lehigh Canal	9
Delaware Division Canal	$73
Delaware and Raritan Canal	50
Freight	1 20
Total	$2 39

Freights.—Oct, 1871.

TO EASTERN PORTS.	Cumberland. From Georgetown.	Cumberland. From Baltimore.	Anthracite. From Philada.	Anthracite. From East Port, Port Johnson, and Hoboken.	Anthracite. From Newburg...	Anthracite. From Rondout...
Amesbury			$2 50	$1 95		
Bangor	$2 75		2 25	1 70		
Bath	2 75	2 65	2 35	— —		
Boston	2 60	2 60	2 25	1 85	180	1 85
Bridgeport	2 25	2 30		1 10	1 10	1 25
Bristol		2 60		1 50		1 50
Cambridgeport			2 35	1 85		
Derby				1 25		
Dighton	2 30	2 35		— —		
East Cambridge				1 85		
Fall River	2 25	2 30		1 40	1 40	
Hackensack						
Hartford	2 75	3 00	2 40	1 50		
Jersey City		2 00		80	70	
Middletown				1 25		
Mystic				1 25		
New Bedford	2 50	2 35	2 00	1 40		
Newburyport	2 75			1 90		
New Haven	2 25	2 30		1 15	1 10	1 35
New London	2 25	2 30	1 95	1 25		2 20
Newport				1 40		1 25
New York	2 00	1 90	1 40	75	70	1 40
Norwalk		2 30		1 10	1 10	65
Norwich	2 25	2 30		1 20	1 40	
Pawtucket	2 50	2 50	2 15	1 20		1 50
Portland	2 50	2 60	2 40	1 70		1 65
Portsmouth, N. H	2 75	2 75		2 00		2 00
Providence	2 25	2 30	2 00	1 40	1 50	1 50
Rockport						
Saco	2 75		2 65	— —		
Sag Harbor				1 20		
Salem	2 60	2 65	2 25	1 80		
Stamford				1 10	1 10	
Stonington				1 25	1 20	
Taunton				1 80		1 40
Warren				1 40		
Washington			1 25			
TO RIVER PORTS.						
Albany		80			55	
Catskill		70			50	
Cockaackie		70			50	
Coeyman's		70			65	
Cold Spring	2 20	70			30	
Fishkill		70	1 60		50	
Haverstraw					60	
Hudson	2 20	2 25			40	
New York					60	
Nyack			1 75		30	
Poughkeepsie					30	
Rhinebeck						
Rondout					75	
Saugerties			1 60		40	
Sing Sing					75	
Stuyvesant					75	
Tarrytown					75	
Troy					55	
West Point			1 75			
Yonkers					60	

MARKET REVIEW.

FOR THE WEEK ENDING OCTOBER 21, 1871.

IRON.—The market for both Scotch and American Pig remains in the same position as for some time past, the demand only being for small parcels, but with a limited supply, holders are enabled to maintain full rates, we have only to notice sales of 150 tons Glengarnock at $36 from yard, and $35 from ship. Wrought Scrap continues in moderate request, and we notice further sales of 200 tons No. 1, ex ship, at $39 25 currency. There is a moderate demand for new Rails at steady prices—600 tons 56 lb. Stockton sold at 357 gold, cash; and 400 old Double-headed, on private terms. Refined Bar from store is steady and firm at our quotations. Russia sheet has been very quiet—sound, of which there are a few packs left, is steady at 17½@18 cents gold. Common Sheets are quiet, but very firm at our quotations.

LEAD—Foreign Pig continues in limited request, and prices are not very firm—we quote nominally $5 95@$6 gold for ordinary. Bar 9¼ cents. Sheet and Pipe, 10¼, and Tin-lined Pipe 15, cash all less 10 per cent. to the Trade.

COPPER.—New Sheathing and Yellow metal are steady. Ingot is in moderate demand and prices are a shade easier—sales have been made of 250,000 lb. Lake at 23½ @23¾ cents, cash and short delivery.

SPELTER.—The market for Foreign remains inactive, but prices are unchanged—we quote 5¾@6½ cents gold, as to brand—25 Missouri sold at 7¼ cents currency.

STEEL.—There is no change in any description.

TIN.—The market for Pig continues very quiet, and sales are only in a retail way for consumption—the sales are 150 pigs Straits in lots, at 36½ cents gold, and 5 tons English, on private terms. Latest cablegrams from England quote English L. and F. £141, and Banca £138. Plates are steady and firm at previous quotations—the sales are 1300 bxs. assorted Charcoal Tin, at $8 87½; 2050 do. Charcoal Terne, $8@$8 25; and 450 do. L. C. Coke, 14 by 20, $8@$8 12½, gold.

ZINC.—Sheet continues steady, with sales of 30 casks Mosselmann from dealers' hands, at 8¼@8¾ cents gold, net. Belgian sheet 8½c. gold; Manganese black oxide, 3½c. currency: Pyrolusite, grey color, 5½c.

METALS.

NEW YORK, Oct. 21, 1871.

IRON.—Duty: Bars, 1 to 1¼ cents ℔ lb; Railroad, 70 cents ℔ 100 lbs.; Boiler and Plate, 1½ cents ℔ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ℔ lb; Pig, $7 ℔ ton; Polished Sheet, 3 cts. ℔ lb; Galvanized 2½; Scrap Cast, $6; Wrought, $8 per ton.

	Store Prices.
Pig, Scotch No. 1, ℔ ton	35 00@38 53
Pig, American, No. 1	37 00@38 00
Pig, American, No. 2	35 00@36 00
Pig, American, Forge	33 00@34 00
Bar Refined, English and American	80 00@— —
Bar Swedes, assorted sizes (gold)	85 00@100 00
	Store Prices, Cash.
Bar, Swedes	107 50@120 —
Bar, Refined, ord'y sizes	85 00@ — —
Bar, Refined, 1¼ to 6 by ¼ @ 5-16 inch	— —@ 90 00
Bar, Refined, 1 & 1¼ by ¼ & 5-16	— —@ 92 50
Bar, Refined, 2½ to 3 Round & Square	— —@ 92 50
Scroll	102 50@132 50
Ovals and half-round	102 50@122 50
Band	— —@ 97 50
Horse Shoe	100 00@105 00
Rods, ⅝ to 3-16 inch	80 00@125 00
Hoop	107 50@150 00
Nail rod	6¾@— —
Sheet, Russia, as to assortment (gold)	17½@18
Sheet, Single, D, and T. Common	—4¾@— 5¾
Sheet, D, and T. Charcoal	—5¾@—6¾
Sheet, Galv'd, Nos. 14 to 26	27½ to 30 ct. dis. 12@14c ℔
" " Nos. 27, 28, and 29	27½ to 30 ct. dis. 15@18c ℔
Rails, English (gold), ℔ ton	— — @59 00
Rails, American, at Works in Pa.	70 00 @71 00

STEEL.—Duty: Bars and Ingots, valued at 7 cents ℔ lb or under, 2¼ cents; over 7 cents and not above 11, 3 cents ℔ lb; over 11 cents, 3½ cents ℔ lb, and 10 ℔ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ℔ lb	— 15 @— 18
English Spring (2d and 1st quality)	— 7 @— 10
English Blister (2d and 1st quality)	— 10 @— 17
English Machinery	— 11 @— 13
English German (2d and 1st quality)	— 10½@— 12
American Blister "Black Diamond"	— — @— 12
American, Cast, Tool do.	— 15 @— 16
American, Spring, do.	— 9 @— 11
American Machinery, do.	— 9 @— 10
American German, do.	— 9 @— 11

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 4 cents ℔ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ℔ lb	— @— 32
Copper Bolts	— @— 34
Copper Braziers, 16oz. and over	— @— 34
Copper Nails	— @— 39
Copper, Old Sheathing, &c. mixed lots	20 @— 21
Copper, old, for chemical purposes, 14@16 oz	23½@— —
Copper, American Ingot	23½@— 23¾
Yellow Metal, New Sheathing & Bronze	— @— 22
Yellow Metal Bolts	25 @— —
Yellow Metal Nails	— @— 23

SPELTER—Duty: In Pigs, Bars & Plates, $1.50 p. 100 lb

Plates, Foreign	(gold) p. 100 lb. 5 75	@ 6 12½
Plates, Domestic	p. lb. — 7	@— 11

LEAD.—Duty: Pig, $2 ℔ 100 lbs.; old Lead, 1½ cents ℔ lb: Pipe and Sheet, 2¾ cents ℔ lb.

Galena, ℔ 100 lbs	— —	@— —
Spanish (gold)	5 95	@6 00
German, do.	5 95	@6 00
English do.	6 15	@6 50
Bar (net)	9 25	@— —
Pipe (net)	— —	@10 25
Sheet	— —	@10 25

Colwell, Shaw & Willard Tin-Lined Lead Pipe 15 cts. ℔ lb.

TIN.—Duty: Pig, Bars, and Blocks, 15 ℔ cent. ad val.; Plate and Sheets and Terne Plates, 25 ℔ cent.; Roofing 25. ad val.

	Gold ℔ lb.
Banca	41 @41½
Straits	36½@36¾
English	34¾@35

PLATES.

Fair to Good Brands.	Gold.	Currency.
I. C. Charcoal, ℔ box	$8 75 @9 00	$10 25 @10 75
I.C. Coke	7 50 @8 50	9 00 @10 00
Coke Terne	6 37½@7 50	7 25 @ 9 00
Charcoal Terne	7 25 @8 25	9 50 @ 10 00

ZINC—Duty: Pig or Block, $1 50 ℔ 100 lb.; Sheet, 2½ cts. ℔ lb.

Sheet, No. 9 Foreign	℔ lb.— @—	— 9½ @ 10

PETROLEUM STOCKS.

Petroleum is weaker. Home and United States have materially declined. One thousand shares of Central changed hands this A. M. at 65; that is the most noteworthy feature in the report, which we append as follows:

	BID.	ASKED.
Bennehoff Run	20	—
Bergen Coal and Oil	15	—
Bliven Oil	30	—
Blood Farm	—	—
Breevoort	25	—
Buchanan Farm	40	—
Central	60	—
Clinton	—	—
Home	155	—
National	—	—
New York & Allegheny	50	—
Northern Light	34	—
Phillips Pet	—	15
Pithole Creek	—	100
Rathbone Oil	20	—
Rynd Farm	30	—
Second National	—	40
Sherman & B	—	—
Tarr Farm	—	—
United Petroleum Farms	—	40
United States	—	40

Mining Stocks.

With the exception of slight advance in Grass Valley and Smith & Parmelee, the list of mining stocks remains as reported in our last. On the 13th inst. 500 shares of Grass Valley changed hands at 6, and, on the 14th, 100 Smith & Parmlee sold at 25—those sales completing the transactions for the week. We submit the following list as furnished by the Board:

GOLD STOCKS.

	BID.	ASKED.
American Flag	—	20
Bates & Baxter	25	—
Benton	—	5
Black Hawk	—	—
Central Gold	4	—
Cons Gregory	—	40
Grass Valley	6	—
Gunnell	10	—
Holman	—	—
La Crosse	15	—
Liberty	—	—
Mariposa prf	—	—
Montana	—	—
Rocky Mount	—	5
Quartz Hill	—	20
Smith & Parmlee	23	—
N. Y. & Eldorado	—	—

San Francisco Stock Market.

Our list of quotations from the San Francisco Mining Stock Board is dated Oct. 17th. "First Board," a slight decline in Gould & Curry and an unchanged condition of Raymond & Ely, are the only exceptions to a firmer state of the market. Belcher again forms the most prominent feature in the operations of the Board, having advanced $75 per share since our last. Our friends on the Pacific coast can certainly bear off the palm in regard to a fancy manipulation of stocks; it has been conceded that New York was entitled to that prominent distinction, but we only do a retail business here, in that line, compared with the recent fluctuations evinced in the prices of some of the prominent stocks of the Comstock lode. On the 15th inst., Hale & Norcross was quoted at $89, and, on the same date, Raymond & Ely stood on the list at $130. Kentuck figured in the operations of the Board on the 12th inst. at $1 75, and thereabouts. The report is as follows:

Savage	41½
Yellow Jacket	60½
Kentuck	No Sales
Chollar Potosi	32
Gould & Curry	100
Belcher	385
Imperial	No Sales
Amador	"
Crown Point	285
Raymond & Ely	110

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CONSOLIDATION COAL COMPANY,

Of the best quality for manufacturing, steam generating, and domestic purposes.

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G. MEREDITH, South Gay street,
Baltimore.

Mch 7 tf

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95TH AUCTION SALE.

100,000

TONS SCRANTON COAL,

ON WEDNESDAY, OCT. 25TH. 1871.

NEW YORK, October 18, 1871.

The DELAWARE, LACKAWANNA AND WESTERN RAIL ROAD COMPANY will sell, by Messrs. JOHN H. DRAPER & Co. Auctioneers, at the Company's Sales Room, 26 Exchange Place, corner of William street, New York, on Wednesday, Oct. 25, at 12 o'clock, noon,

100,000 TONS

of COAL, from the Lackawanna regions, of the usual sizes, deliverable at their Depot, Elizabethport, N. J., during the month of November, 1871.

The sale will be positive; each lot put up will be sold to the highest bidder; no bids, in any form whatever, being made for account of or on behalf of the Company. The conditions will be fully made known at the time of sale.

TERMS: Fifty cents per ton, payable in current funds, on the day of sale, and the balance, within ten days thereafter, if required, at the office of the Company.

SAMUEL SLOAN, President.

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MANUFACTURED BY MILLERS FALLS COMPANY, No. 78 Beekman Street, New York City.

This is the best Scraper in use, and more of them are sold than of all other kinds. It will save its cost in a week.

Price one dollar per inch to fit all sizes from 1½ to 4 inch tubes.

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Eaton & Cole, New York, N. Y.
J. J. Walworth & Co., Boston, Mass.
Dudley Brothers, Buffalo, N. Y.
Wm. Bingham & Co., Cleveland, Ohio.
Novelty Works, Detroit, Mich.
Northwestern Mfg. Co., Chicago, Ill.
Post & Co., Cincinnati, Ohio.
C. Dugan & Co., Baltimore, Md.

Sep-17-tf

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Wilkesbarre and Lehigh Coal,

FOR STEAM AND FAMILY USE.

OFFICE:

Room No. 49, 111 BROADWAY, (Trinity Building).

JNO. WHITE,
jan1-1y LINDLEY H. FOWLER,
LOUIS T. SNOW.

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By impregnating or painting wooden or brick buildings, bridges, railroad car-houses, stations, shingles, pavements, etc. Bricks and mortar soaked in the **Soluble Glass** will make them as solid as granite blocks, also fire and waterproof. It can be mixed with any mineral color, and applied with an ordinary brush as a paint. We offer it in concentrated liquid, which will stand three dilutions with water, in barrels of 40 gallons, at low price, with full directions. Apply to **L. & J. W. FEUCHTWANGER,**
Chemists, 55 Cedar street, New York.

LECTURES AT THE IMPERIAL-ROYAL SCHOOL OF MINES will commence October 14th, Clausthal (Prussia), Dr. VON GRODDECK, Director.

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(Late Professor of the N. Y. Medical College, of Mechanics, etc., at the Cooper Institute, and of Industrial Science at the Girard College, Philadelphia.)

Analytical & Consulting Chemist and Engineer.

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DEPARTMENT OF POPULAR SCIENCE.

Our Tongues.

II.

It is not so easy, Madam, as you might perhaps suppose, to determine the precise locality where the sense of taste is seated. The obvious experiment would be to apply to different parts of the tongue and mouth a substance of decided savor, and to note at what points this savor could be perceived. But there are several sources of error, some of which will suggest themselves to you, if you recall our last conversation.

In the first place, the sense of smell interferes, by recognizing all the aromatic flavors, both before and after the substance is tasted. Then the sense of touch puts in a disturbing opinion, replying loudly when appealed to by sharp and pungent substances. Can you tell, Madam, with what particular spot in your mouth you tasted the red-pepper lozenges which Johnny kindly gave you, on the first of last April? That interesting child, moreover, mixed horse-radish with the grated cocoanut, not to the improvement of the pudding; and a large company tasted horse-radish at dinner with the entire interior surface of their mouths, tongues, and noses. Such pleasures are scarcely local in their nature!

But the sense of touch confuses the judgment in another way, namely, by calling in the associated sense of locality. For the substances susceptible of taste must be, as we have seen, soluble; and, wherever they are placed in the mouth, they may be dissolved by the omnipresent saliva, and carried to the nerves of taste, while we are likely to connect the taste perceived with the touch or pressure of the substances themselves; and so refer it to the place where that pressure takes place.

We should then choose for experiment a substance having a simple savor, without aroma or pungency; and we should be on our guard against false conclusions, drawn from its rapid diffusion through the saliva. For the latter point, it is sufficient to reject from our argument all sensations which are perceived after a measurable interval of time.

Thus, a small piece of sugar, laid on the end of the outstretched tongue, gives no immediate sensation of sweetness; and a similar negative result may be even more strikingly observed when some intensely bitter substance is employed. Moreover, with the aid of a delicate camel's hair brush, the experiment may be tried with sweet or bitter liquids upon all parts of the tongue and mouth; and it will be found that, aside from the gradual though swift diffusion through the saliva, no portion of these surfaces responds, except a small area at the back of the upper side of the tongue.

The same conclusion is indicated by experiments in vivisection. There are three distinct pairs of nerve-bundles terminating in the tongue; and it has been a question whether one only, or all of these, can convey the sensation of taste. To determine this point, each of these three pairs has been at different times severed in a living animal, and the test has been made whether its sense of taste has been thereby impaired or destroyed. For instance, colocynth in milk is offered to a dog; he begins to lap it greedily, but after the first drop is tasted, he rejects it with disgust. That dog isn't fit for any further experiment in that line; since he will probably refuse even milk, after such a dose. But another dog, who has never experienced the treachery of man in lacteal solutions, may be tested with the same bitter compound, after one of the three nerve-pairs alluded to has been carefully severed. (You needn't scream, Madam; we give the dog chloroform, and he isn't hurt in the interest of science so much as he would be in the interest of fun, if Johnny had matched him with the butcher's bull-pup.)

If the damaged or incomplete dog still rejects the bitter mixture after the first experience of it, we may conclude that the nerves severed were not those of taste; if he greedily devours the whole of it, as if it were pure milk only, we are reasonably sure that we have effectually destroyed his sense of colocynth, especially when it appears that the severance of one pair only, and not that of either of the other pairs, produces this effect.

In this way physiologists have concluded that the so-called *glosso-pharyngeal* nerves are the channel of taste. I must confess that I do not think the evidence perfectly decisive—so far as I have been able to get hold of it The sense of colocynth (or bitterness) is not necessarily the whole sense of taste; and experiments such as I have described do not exclude the idea that the two other nerve-pairs may convey the sensations of sweetness and sourness. But, on the other hand, it is claimed that the functions of these two pairs are pretty well-known; that one of them furnishes the sensations of touch to the tongue (originating conceptions of form, size, weight, softness, solidity, oiliness, pungency, etc.), while the other communicates to that organ the power of motion.

Moreover, the *glosso-pharyngeal* nerve-bundles terminate principally in the back of the tongue, where we have seen that taste is probably seated; so there is collateral evidence in their favor. But then, on the other hand again, the fibres of the same pair are distributed to the entrance and neck of the throat, where, so far as we can ascertain, no taste is exercised. This difficulty is explicable, perhaps, on the supposition that the parts mentioned, having had plenty to do in the mechanical line of swallowing, hemming, and hawing, etc., have gradually retired from the finer business of tasting. Or, the faculty of tasting may have been acquired through many generations of animal life, in one or another process of evolution or change, by the tongue-fibres and not by the throat-fibres, of the same nerve-pair. Or the facts may be as we find them, and the explanation entirely unknown—which is the case, Madam, with a large number of facts. Or, finally, the facts may not be at all as we find them, our observations being defective—which is the case, Madam, with a large number of observations.

Nevertheless, putting together all our hints and fragments of knowledge, and conveniently ignoring a few troublesome little contradictions, we may conclude for the present that the *glosso-pharyngeal* nerves are the nerves of taste.* But we will talk further of this sense at another time. I trust you are too strong-minded to permit horrid thoughts of half-dissected puppies to affect your enjoyment of supper, or allow reminiscences of colocynth and milk to interfere with those delectable *glosso-pharyngeal* sensations which your excellent *café au lait* is calculated to produce.

R. W. R.

* Scanty observations, *post-mortem* and otherwise, upon diseased human subjects, indicate the same conclusion.

Tunnelling the Eng ish Channel.

The scheme of connecting England and France, by means of a railway tunnel under the channel, between Dover and Calais, seems to be taking a more tangible shape than it has ever yet assumed. We are assured, by the London *Times*, that delay in commencing this stupendous undertaking is only caused by the necessity of obtaining a concession from the French government, which has, of late, been so much occupied with other affairs, that it has had no time to consider tunnel schemes of any sort.

In 1867, at the suggestion of the French emperor, an international committee was appointed to consider the feasibility of any schemes for a channel tunnel which might be presented to it. In 1868 the engineers employed by the committee made a report containing the following conclusions:

I. That there is a reasonable prospect that the work can be accomplished, but that it would be improper to deny that it is attended with a certain amount of risk.

II. That this risk is limited to one contingency, viz., the possibility of sea water finding its way by some unforeseen fissure into the workings in quantity too great to be overcome. Apart from this risk, tunnelling in chalk is easy and rapid, and the execution of a tunnel of the length of the one under consideration is only a question of time and expense.

III. There seems to be no reason to assume that the tunnel would cost more than ten millions sterling, or that it could not be completed in nine or ten years.

IV. The question of risk would be fully solved by sinking land shafts on each coast and driving the preliminary driftways. This portion of the work being safely accomplished, the remainder would be of an ordinary character.

V. The possible loss would be measured by the cost of this preliminary work, which we estimate at one million and a half, and which could not exceed two millions, or say one-fifth of the whole cost of the tunnel.

VI. That this risk should be undertaken by the Governments of France and England, if, after consideration, they deem the importance of the work and the probability of its completion sufficient to justify them in doing so.

In 1869, a commission of French engineers made a report, in which they say that they are of opinion that driving a submarine tunnel in the lower part of this chalk is an undertaking which presents reasonable chances of success. Nevertheless, they would not hide from themselves the fact that its execution is subject to contingencies which may render success impossible. These contingencies may be included under two heads: either in meeting with ground particularly treacherous—a circumstance which the known character of the gray chalk renders improbable—or in an influx of water in a quantity too great to be mastered, and which might find its way in either by infiltration along the plane of the beds, or through cracks crossing the body of the chalk. Apart from these contingencies, the work of excavation in a soft rock like gray chalk appears to be relatively easy and rapid; and the execution of a tunnel, under the conditions of the project, is but a matter of time and money.

The *Times* proceeds to make very sanguine predictions regarding the future success of the scheme, basing them principally upon the softness of the material, and the consequent cheapness of the excavation; the fact that the Mont Cenis tunnel has been completed, though the rock was harder; the fact that Mr. Hawkshaw, who now firmly believes in the feasibility of the tunnel, predicted the success of the Suez canal when many good engineers doubted it, and of whom the *Times* says "the soundness of his views as to piercing through the desert gives credit to his opinion as to burrowing under the sea;" and finally that English mining engineers, in proof of the ease with which the workings could be ventilated, point to Whitehaven and Northumberland "where galleries are worked under the sea, which occupy, in their manifold turnings, many times the distance between England and France."

We are loath to throw cold water on any proposed plan, the successful accomplishment of which is so desirable, but we must say that we fail to see the force of some of the arguments, and we are surprised to see that the *Times*' article is copied into so good a technical paper as the *Colliery Guardian* without a word of comment.

No estimate of the cost of constructing the tunnel is given, though its successful completion would, without doubt, warrant an immense outlay.

Stone-Coal Blast Furnaces at Marquette.

The *Mining Gazette* has it from undoubted authority that one or two blast-furnaces, in which stone-coal will be used as fuel in reducing iron ore, will be erected in the city of Marquette within the coming year. This is an undertaking of great moment to the iron interests of Lake Superior, and from the known practical character of the men who have the matter in charge, the success of these pioneer stone-coal stacks, when erected, is beyond a doubt.

THE ENGINEERING AND MINING JOURNAL.

ROSSITER W. RAYMOND, Ph. D.,
WILLARD P. WARD, M. E.,
Editors.

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THE SCIENTIFIC PUBLISHING COMPANY,
WILLARD P. WARD, MANAGER,
37 PARK ROW,
P. O. Box 4404. NEW YORK CITY.

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The Examination of Mining Titles.

IN the purchase of a mining property on our public domain by a corporation, especially by a foreign corporation, the first thing to be looked into is the title. We have on various occasions exposed the weakness and corruption of our local mining customs which have been unfortunately too much recognized in federal legislation.

It is true, on the other hand, that many mine-owners are better off under the possessory, local title than they would be if they acquired a firm title by U. S. Patent. The latter raises troublesome questions of taxation; it is ambiguous as to the actual ownership of the ground, but it is rigid as to surveyed limits. And these points may become, in certain instances, very annoying.

But foreign purchasers have no option. Under the present construction of our General Land Office, the possessory title under the local customs is one which cannot legally be transferred to persons not citizens of the United States; and one or two shameful cases have occurred, in which Chinese miners, after purchasing claims from white men, have been violently ejected from what was in equity, though not in law, their property. The first section of the "Quartz law" of 1866, is as follows:

Be it enacted, etc. That the mineral lands of the public domain, both surveyed and unsurveyed, are hereby declared to be free and open to exploration and occupation *by all citizens of the United States, and those who have declared their intention to become citizens* subject to such regulations as may be prescribed by law, and subject also to local customs or rules of miners in the several mining districts, so far as the same may not be in conflict with the laws of the United States.

This is the sole basis of the rights acquired in any mining district, previous to the application by the claimant for a U. S. Patent. With regard to such application, paragraph 15 of the Instructions issued August 8th, 1870 from the General Land Office says:

Proof of citizenship is required. Where the applicant is a corporation, a copy of its charter or certificate of incorporation may be filed in lieu of evidence of citizenship.

But a very recent decision (which we have not yet perused) is reported to have been made by the new Commissioner of the Land Office, to the effect that application from a corporation must be accompanied with proof of the actual or intended citizenship of everp stockholder! We do not pause to discuss the wisdom of all these provisions and constructions of the law. It is enough to point out the position in which they leave all foreign companies. *The only valid title which a company comprising alien stockholders can obtain under these rules is that of a U. S. Patent, issued to a citizen or company of citizens, and afterwards sold by them to the foreign owners.* Are all the English stockholders in American mines so protected?

We know that mine-owners represent (and perhaps consider) the possessory title as perfectly good; but we know also that it is never safe from blackmailing counter-claims, which may be sprung upon it at any moment. One consideration is, however, decisive for the interests of foreign investors. A citizen may hold under a possessory title as long as he chooses, and apply for a patent whenever it suits his convenience. But foreigners, whether individuals or corporations, can never, according to the official decision under our mining law, acquire a patent at all. They should therefore, in all cases, insist upon the previous procurement of a patent from the vendor. This has the further advantage, that it cuts off all chances of interfering claims, and relieves the purchasers from the necessity of mastering the complicated, absurd and often unwritten code of "the local customs," upon which their possessory title (even if they could legally acquire one) would always depend.

But it may be objected that a patent cannot be obtained even by a citizen, until a thousand dollars' worth of work has been done on the mine, and certain formalities of survey, advertisement, etc., costing several hundred dollars more, have been complied with—and the honest miner cannot afford this expense. So he "bonds" his claims to somebody who is making up a big lot, and who thus disposes of the lot, at so many dollars per thousand "feet."

The matter with the honest miner in such a case is that he is not honest. He wants to sell, and he recognizes no relation between value and price. The law requires a thousand dollars' worth of work to show that there is a mine, not merely a claim; it requires a survey to show where the mine is, and to prevent some other enterprising discoverer from claiming it over again; it reqnires an advertisement, to make sure that the applicant for title is really the recognized occupant and possessory owner. Would any sane man buy property till he knew whether it existed, exactly where it was, and whether there were other claimants besides the vendor? Yet many shrewd capitalists do this in mining matters, virtually buying a problematical pig in an unknown poke of an alleged owner.

In conclusion, we repeat, that the road to profitable investments of foreign capital in our mines is open and easy. We are attempting to show, step by step, how it is to be found and followed. The argument of the London *Times* and other croakers, drawn from the disasters of the past, assumes that capitalists will continue to be as reckless and foolish as they have been in the mining excitements of former years. The *Times* finds it impossible to scare people; let it assist us to enlighten them.

Amateur Metallurgy.

MR. GEORGE FRANCIS TRAIN, whose boast it is to know all about any subject in a minute, and tell all he knows in another, has recently issued a pronunciamento on the subject of smelting-works in Omaha. He proposes a capital of $1,000,000 and a capacity of 100 tons per day, although "there is no reason why we should not make it a thousand tons a day, or 300,000 tons a year, if the mines are as rich as reported."

Mr. TRAIN sums up the necessary science in this brilliant sentence: "We have the argentiferous galenas of Utah, the sulphurous rebellious ores of Colorado, with pyrites of iron, the stony ores of the mountains and the various other grades of all mining interests here concentrated so that the skillful metallurgist can combine these *so as to smelt without using sand (!)* thereby saving fuel and labor."

Gen. E. M. BARNUM, to whom this farrago of nonsense is addressed, replies with a letter, written in the cars between Chicago and Omaha, in which he says that the argentiferous galena deposits of Utah are inexhaustible, and that "it is no exaggeration" to put the amount of ore in sight, that will "pay for shipment," at more than a million tons. This is not exaggeration, because it is something worse. Has Gen. BARNUM's long experience not taught him to judge sanely with respect to the quantity of ore "in sight" in a couple of hundred holes and half a dozen mines? Or has his practice been exclusively confined to making statements? According to his own figures, the shipments of ore from Utah in May were about 514 tons; in June, 1785 tons; and in July 3064 tons. The greater part of this was shipped, as he knows, by the Emma mine, which is now "for sale."

"Nearly all these products" says Gen. BARNUM, "have gone to Liverpool, for reduction at Swansea in Wales." This also is "no exaggeration," but a clear blunder. Ores sent to Liverpool are reduced in that neighborhood; ores to be reduced at Swansea are shipped to that place, which is a seaport—a fact which may prove troublesome to the General, in his plan of making Omaha "the Swansea of America." The ores of the Emma mine have been shipped to Liverpool instead of Swansea, because there is more competition among buyers at the former place than the at latter.

Perhaps Omaha is a proper place for large smelting works—Mr. BALBACH ought to know, by this time. It is more likely, however, to be a good place for separating and refining works. The first smelting of the Utah ores will probably take place in Utah, when the completion of the southern continuation of the Central railroad of that Territory shall have brought available coal and coke to the works around Salt Lake. Why should the miner then ship more than fifty per cent. of gangue over a thousand miles of railroad, simply to enable Mr. TRAIN and Gen. BARNUM to "smelt without sand?" The character and value of the coal of southern Utah have not yet been determined with precision; but it is generally considered by experts as a fair coking coal, which that of Wyoming is not.

Meanwhile, the great trouble with all the western smelting-works is the scanty and precarious supply of ores. We are glad to learn that the Union Pacific R. R. Co. has promised a reduction of freights, and Gen. BARNUM deserves credit for his efforts to procure that needed change. But low freights will favor England as well as Omaha; and the problem of cheap reduction will finally be settled, if possible, by the works in Utah.

In separating and refining, St. Louis will be the great Western rival of Omaha, and possesses some advantages, upon which we will not dwell at present, and which might, after all, not prove decisive. There is no objection to trying experiments at Omaha; but those who risk their capital should have better advisers than the gentlemen we have named, and more careful preliminary reports than flaming epistles, or railway jottings *en route*.

Grand Island district, their average result being $185,60 silver, and $10,26 gold, or a total of $193,06 coin value per ton.

From Clear Creek county 193 assays have been made, averaging $235,52 silver and $18,24 gold, or a total of $253,76 per ton.

These figures are very high, and it will doubtless surprise many that the Grand Island Island assays average so well, being only $49,72 silver and $7,98 gold, total, $57-70 per ton, behind Clear Creek county; but it is just to explain that there were several enormous assays of small specimens of sulphurets from Grand Island, which of course increased the general average tremendously, while most of the Clear Creek county assays are regular mill samples, from ores sold to Hill, Palmer or Stewart.

Mr. Von Schulz has also averaged his assays from the same localities, and given us permission to publish the figures. Three hundred and seventy assays from Clear Creek county averaged $167,63; one hundred and sixty-one assays from Grand Island averaged $57,41. There were also four assays from small pieces of sulphurets from Grand Island, which average nearly $10,000 per ton.

Bearing in mind the large crevices which most of Grand Island leads possess, one would naturally expect them to contain very low grade rock; but assays do not lie, and if the ores assayed from Grand Island are as fair samples as those from Clear Creek, the amount of silver which ought to be produced from Caribou is enormous.

From the *Carbion Post.*

CARIBOU MINE AND MILL.

Caribou, Sept. 29.

Yesterday, in company with Truman Whitcomb, of Nevada, we again descended to the bottom of the main shaft of the Caribou mine. By actual measurement we found the crevice of paying ore over seven feet wide. This is an increase of two feet in width, in sinking the last fifteen feet, the total depth being now 212 feet. The whole of this body of ore is marketable, the lowest grade being estimated at $120 per ton. The highest grades are worth some thousands per ton. Suppose the average is put at $200 per ton—this shaft is 12 feet long, and is therefore producing 84 cubic feet of solid silver bearing rock at every foot in depth—or six tons of ore—yielding $1,200. Ordinarily, in good mines, the ore raised in sinking a single shaft, does not pay expenses. The third level is run at the depth of 200 feet, and now extends east 38 feet, and west 20 feet. The ore-vein on this level shows the same as in the 100 foot level, the next above, with increase in thickness corresponding with the increase in the shaft, showing that the remarkable development, as depth is gained, represents the improvement of the whole mine. This expansion of the whole vein, and increase of richness, is unexpected to the most hopeful, as it was supposed the mine would not show its best until down to the level of the park, 400 feet from the surface. In the whole mine, east and west divisions, abou 40 men are now employed. All good miners found are now engaged for the company, and will be until the force is increased to 100 men. Mr. Allum, the foreman, in extending the levels, is prepared to work that number to advantage. Considerable ore is shipped to the works of the Boston and Colorado Smelting Company, at Black Hawk. The large mill at Middle Boulder, built mainly for this mine, is near completion. The mill building will cover a space 100x165—a full description of which, and the processes, will be given as soon as the machinery is all set up. Great as the capacity of these reduction works will be, the mine can be depended on for a full supply of ore—to the extent of 100 tons per day, if reqnired.

Of the value of this ore (which we are careful not to over-state) we may know from the certificate attached to the huge specimen put on exhibition at the Territorial Fair just closed at Denver.

[copy,]

United States Branch Mint,

Denver, Col., Sept. 16, 1871.

I hereby certify that the ore marked "Caribou lode," assayed for B. O. Cutter, yielded gold, ——; silver, 873 ounces, coin value, per ton of 2,000 pounds, $1,134 85.

Jacob F. L. Schirmer.

From the Central City *Register* of October 4th.

Mining is on the increase in Clear Creek county. It is the all-absorbing interest, and has assumed large proportions. With a railroad to carry our smelting ores to the coal banks, will come a population three times the present number. We expect these wonderful things will be realized in less than two years. There are a great many arriving in the county daily, mostly miners, who get work readily at $3 per day. Contractors usually make $4 and upwards per day. The mines are filling up with men, and new mines are being opened. There is a constant increase in the amount of ore raised. We have heard of several companies who are shipping all their first-class ore.

Establishments have recently been erected on the north fork above town, for the purpose of crushing and sacking ore ready to ship. There are several buyers for all the ore taken out. A market for lean ores will very soon be established in our midst. Prosperity is the certain future of our people, who had the faith and pluck to stay at home and weather the storm of the past few year

The Stewart Reducing Company shipped on the 4th inst. $1,000 worth of silver bullion. Palmer & Nichols' shipments amount to $1,000 every day, and Stewart's average is the same. Prof. Dibbin is doing full as well in proportion to his capacity. He is shipping about $500 worth of silver on an average daily. This is the actual silver manufactured daily.

Idaho.

BASIN ITEMS.

From the World.

Mr. C. Clark showed us some specimens of pure pyrites of iron, containing large particles of free gold, brought from his newly discovered ledge in the Granite District.

Messrs. T. S. Harris, R. V. Robie and Uncle Bob Sharp returned a few days ago from the Copeland diggings, having left there September 27th. Capt. Harris informs us that Mr. Ferry completed his ditch to his claims about two weeks ago, and has been at work sluicing for the past ten days on ground that prospects well. Mr. Copeland has been running his claims all summer and is doing well. John Kenally & Co. have about completed their ditch, and will get the water through about the first of next week. Tom Cusick & Co. have also finished their ditch at Paddy's Flat, two or three miles below Kennallys & Co.'s claims, and they will also commence work next week. The diggins are all high bar and hill claims, with plenty of fall and dump, and there is ground enough for thousands of men, as the whole country prospects well. One or two companies are at work in Lake City District, but the water is falling, and work will soon be suspended. Those owning claims at Copeland expect to be able to run for at least a couple of months yet, and probably till everything freezes up.

Nevada.

The following notes on

TREASURE HILL,

are from a correspondence in the *Scientific Press*, of October 7th:

The Eberhardt and Aurora Company's Tramway, Hodgsons' patent, built last year is 11,600 feet in length. The elevation above sea level at the top is 9,150 feet, and at Eberhardt City, the lower end, 7,150 feet. A sixteen-horse power engine at that place furnishes the power for passing the wire rope around the drum, the buckets passing up one line and down the other. The steel wire is suspended on posts, the highest of which is one hundred and thirty and a half feet and the lowest twenty feet. They are built of strong timbers ten inches thick, and braced and framed together stoutly. There are five stations on the line having an angle of thirty-five degrees. The total cost of this tramway was $80,000.

Since it was built they have had some trouble with slack wire, and Mr. Thairwall, the Tramway's Co.'s agent, came from England in order to make such alteration as was deemed necessary. It was found that the difference in the elevation (2,000 feet) between the upper and lower ends was the cause of the expansion and contraction of the wire; it being much warmer at Eberhardt City than up on the hill. The tightening pulley was taken from the hill and placed below where the slack was. The expansion in the whole wire 11,000 feet long and one inch in diameter, was sixty feet. The buckets carry two hundred pounds each at a trip, and the ore can be loaded at the mills below for a cost of from seventy-five cents to one dollar per ton. On one occasion three hundred tons were carrried down in twenty-four hours. The tramway runs down the Mahogany Canon and over a very rough and precipitous ravine, and some of the posts are being raised so as to keep it as much as possible on a level. It is the largest one, I believe, in the United States, and must prove a remunerative investment, as in summer it costs three dollars per ton, and in winter from five to seven dollars for hauling ore in wagons from the mines to the mills below. The curves, either sharp or of a large radius, are easily passed and it answers the purposes of a railway without the necessity of embankments, tunnels or bridges. There are three lines of telegraph wire running up the hill which they use for sending messages, instead of signalizing as formerly.

EBERHARDT CITY

is a small place with but few stores and houses. Through the kindness of the manager I paid a visit to one of the large mills here. There are two very large engines, respectively one hundred and fifty and one hundred and twenty-five-horse power, to drive the stamps, pans, settlers, etc. The fly wheels are eighteen feet in diameter. There are six large boilers to furnish steam for the engine and pans. The mill has sixty stamps, twenty-two pans, eleven settlers and three agitators, and the proprietors claim that they can work the ore up within ninety per cent. of fire assay. Forty men are employed. The arrangements are very complete for doing the work, the pulp being taken from the batteries to the pans in cars, and C. P. Stanford's patent self-feeders are used and said to give satisfaction. The engine, etc., was built by Booth & Co., of San Francisco. The mill generally, under the superintendence of Mr. George Attwood, is one of the finest I have seen on this coast. The

SOUTH AURORA CO.'S MILL

has thirty stamps, weighing seven hundred and fifty pounds each, sixteen pans, eight settlers, and four agitators; they also use the self-feeders, and crush from fifty to sixty tons per day. All the ore for both these mills is brought down on the tramway spoken of above. Near the City of Hamilton are the

ROTHSCHILD'S SMELTING WORKS,

which cost $60,000. There are three large stacks eight feet square. A 40-horse power engine and one of Root's patent blowers are at these works. The building is a stone one, one hundred and eighty feet long and thirty wide. These works are now idle. They were built by J. A. Mattison, who started to build a refinery in connection, but before it was finished his creditors in San Francisco attached the mill, although when completed the furnace was fired up and turned out two hundred and seven tons of bullion. Evarts & Co. have bought all the bills, and, should they not be redeemed shortly, this splendid property will all belong to them. This would be a splendid investment to any parties wanting to look into it, and no doubt would pay well. The district, I have every reason to believe, can furnish a sufficient quantity of base ore to keep the works in operation. One great draw-back to Mr. M.'s operations, was from the fact that the miners would not let him have ore without an advance, because they knew him to be involved.

HAMILTON CITY

is the great centre of all the mining region hereabouts. The high rates of freight now retard the progress of the town materially. It has, however, a bright future before it, as developments show that Treasure Hill instead of being a delusion and a snare, is rich, and likely to be worked for years. The English in particular are investing freely in this section, and furthering the business of mining generally.

Woodruff & Ennor, the well-known stage-men, own a fine ranch in Pine Valley, not far from the Palisades on the road here, and have cut three hundred tons of hay this year. This stage company furnish daily all kinds of fruit from California, which is in demand. The Mormons formally had all this trade, but the enterprise of these gentlemen has taken it from their hands and given the benefit to our State. Leaving Treasure Hill, I paid a visit to

SHERMANTOWN,

which is very dull at present, and but two mills are running. The Oasis, owned by an English company, is running on Ward Beecher ore. It has ten stamps, ten pans, and works fifteen tons of ore a day. They use one of Blake's crushers, and have on hand three hundred tons of ore.

THE METROPOLITAN MILL

is running on tailings, and it is said that it will be removed to Eureka shortly, as some of the owners have bought mining interests in that district. The town has declined in property and many of the inhabitants are moving to Eberhardt City on the opposite side of Treasure Hill. An English company have bought the pipes in the streets and will bring the water to the latter place.

Six months ago two Germans located a mine about one and a quarter miles north of the White Pine smelting works. They have exposed the ledge for two hundred and seventy-five feet and taken out one hundred and

MINING SUMMARY.

California.

We copy the following compilation of California mining items from the San Francisco *Bulletin* of Oct. 6:

IMPORTANT DEVELOPMENTS IN BUTTE.

On Tuesday morning last, says the Oroville *Record* of September 30th, we received a call from SAMUEL OLTON, who was on his way below with some very rich and valuable specimens of gold and silver ore, taken from ledges on the upper waters of the Feather River, near the dividing line between Butte and Plumas counties. These ledges are of recent discovery, and the silver ore we have seen promises as well as the famous silver mines at Nevada. They are near the head of Big Kimshew and Philbrook Valley. A new mining district has been formed under the name of Golden Summit District, and rules and regulations adopted. The silver ledge is fifteen feet in width. A shaft has been sunk to the depth of only some eight or ten feet. Some of the rock thrown out by the blasts has been sent below and assays $450 to the ton. Parallel to this silver ledge is a vein of gold bearing quartz, which abounds in pure gold, and produces some very fine specimens. Some four miles in a northerly direction, is another very rich quartz ledge, from which $500 was taken recently in one day with a hand mortar. These new discoveries are in the vicinity and partially surrounded by the bank diggings that have long been known as the Gravel Range. Being near the summit of the mountains, between Inskip and Humbug Valley, Plumas county, the winters are very severe, and but little progress has been made with the bank diggings. There can be no longer a doubt of the mineral wealth of that section. As the snows of winter will soon envelop it, it is probable that but little will be effected the present season; but another summer will witness developments that will show Butte county to be one of the richest mineral sections on the Pacific Coast. These claims are on the head waters of Feather river, but so high that it is impossible to carry water to them, except from the melting snows. These ledges and bank claims, being found at the head of what is known as the Dogtown Ridge, or the divide between the waters of the North Fork and those that flow westerly into the valley of the Sacramento. seem almost to confirm the belief formerly entertained by miners that there was some original place of deposit, from whence the gold had washed into placers and gulches, where it was first discovered. It requires but a small stretch of the imagination on the part of those familiar with the mineral wealth of the ridge as heretofore developed, to locate the original deposit on these bleak, bold and barren hills, and then follow the wash down to Inskip, Kimshew, the rich placer mines that have been worked in the gulches leading into West Branch; to Cherokee Flat, Morris Ravine, at the mouth of which is Feather river, and where was found the richest of the celebrated Cape Claim in 1857.

LIVELY TIMES IN AMADOR.

The Amador mine, says the *Ledger* of the 30th ult., is now in complete working order for the first time in nearly eighteen months. One year ago last April the main shaft was burned out, and the time until the present has been devoted to repairing the shaft and putting up new hoisting works, and to-day it is the best and most complete shaft and hoisting works on this coast. In place of the old bucket plan of hoisting rock, they have a substantial "cage," on which iron cars, capable of holding eighteen hundred pounds of quartz, are run and speedily hoisted to the surface, and many other modern improvements.

The Original Amador Mining Company, at Amador City, are now erecting a splendid forty-stamp mill, which will be completed in a short time. They have also opened a new shaft from the two-hundred-foot level, which is intended for the main rock shaft. Their mine is doing fine, with an abundance of excellent quartz in sight.

The proprietors of the Keystone mine are taking out the twenty stamps erected by them last year, and placing firmer foundations under them. They are also adding twenty more stamps, which will be ready for operation by the time there is sufficient water to supply the batteries.

The Mason mine, located a short distance south of Amador City, is now being worked under the superintendence of Mr. POUNDSTONE. The shaft has been sunk to a depth of two hundred feet, with a drift of eighty feet, showing a good ledge of rock. Some of the rock has already been crushed, and pays very satisfactorily. They have several hundred tons of rock now on the dump.

The case of the Austrian Mining Company against the Mahoney Mining Company, involving the title to the Mahoney mine at Sutter Creek, says the *Dispatch* of the 30th ult., was tried in the District Court this week, and finally decided on Thursday in favor of the Mahoney Brothers.

The proprietors of the Potosi mine, near Drytown, have lately struck a seven-foot ledge of good rock, all of which prospects well. They will resume the business of crushing as soon as a supply of water can be had.

CALAVERAS COUNTY.

The Tuolumne Hill *Chronicle* of September 30, says: Messrs. HIRCHNER, SIEGLER & KEY, proprietors of the celebrated "San Bruno" mine near Mosquito Gulch, have out a large quantity of rock in readiness for crushing. The mine is being placed in splendid condition for working.

The "Good Hope" mine, in the same district, owned by ASBURY, SMITH & Co., will soon be tapped one hundred and sixty feet below the surface by means of a tunnel. The mine is known to be a good one.

Work is progressing favorably at the "Petticoat." The shaft is sinking rapidly.

Once more the pleasing duty of chronicling a large yield from the Prussian Hill mine, at Railroad, is vouchsafed to us—the second instalment of good news from that particular locality within a week. Sixty tons of ore taken from the shaft, crushed in Randolph's mill, yielded $2,363, averaging a fraction less than forty dollars per ton. The shaft isn't a hundred feet in depth yet, and a thousand tons of just such rock are in sight. Somehow or other Calaveras, for a county that hasn't got any paying quartz ledges, is shipping an immense amount of bullion.

A very promising quartz lead has recently been discovered near Independence, in this county. As yet but little work has been done, but the prospects obtained are flattering. The ledge is from five to six feet in width, one of the largest veins in that district. We were shown a piece of top rock taken from the lode, that contained considerable free gold. Messrs. ROENTTCHEN & Co. are the lucky proprietors.

MINES IN PLACER COUNTY.

We notice this mining intelligence in the Auburn *Stars and Stripes* of September 28th: Our advices from the Yolo claim, above Last Chance, which have for some time been interrupted by the excitement of the political campaign, bring renewed assurance that this is one of the richest gravel mines ever opened in Placer county. Our last advices were down to a date in the latter part of July, when a cave interrupted extended operations. This mishap was soon remedied, when operations on the original scale were resumed. The yield for the five weeks ending with last Saturday were as follows: For the week ending August 26th, 93 ounces; September 2d, 85 ozs.; September 9th, 88 ounces; September 16th, 110 ozs.; September 23, 102 ozs.—total for five weeks, with eight drifters, two car men and the Superintendent at work, 478 ozs. The Superintendent ships his dust directly to the Mint, through W. H. WATSON, Secretary of the Company, and thus the Company realize the full value of their product, which averages them about $18 50 per ounce, net. The yield for the five weeks above enumerated aggregates a fraction over $8,000. The expenses for labor, timber, tools, etc., aggregate $1,260, leaving a net profit of over $6,500.

The St. Patrick Mining Company, operating near Auburn, Placer county, says the Nevada *Gazette*, is having a steam engine put up at its mill. This engine will run the stamps, pans, and such things, of the mill. Water is unreliable as a power at Auburn, on account of scarcity, and steam is being substituted. J. M. LAKENAN, of the Grass Valley Foundry, is putting up the engine in the St. Patrick mill, and will have all the machinery in working order on Thursday next. The famous Green mine, near the St. Patrick, is also to have steam engines for hoisting and pumping purposes. Mr. GREEN has purchased two engines formerly used at the Cambridge mine at Grass Valley. One of these will be used for hoisting and the other for pumping. Mr. GREEN's mill will be run for a time by water-power, as heretofore. Mr. LAKENAN is engaged to remove and set up the steam engines at the Green mine.

ALPINE MINES.

The Alpine *Miner* says: Fine ore was struck this week in the extreme lower level of the Schenectady mine. This makes eight or nine different levels and points in which pay ore is found, and no trouble is expected in furnishing plenty to the mill as soon as completed.

One wall at the Tarshish mill, at the foot of Main street, is up, large piles of lumber are framed, and the grading is approaching completion. A large force is kept at work, and hopes are entertained that the mill will be enclosed before winter sets in.

COAL IN SONOMA.

A coal vein is being opened upon the ranch of Mr. S. S. WEEKS, on the Calistoga road, about eight miles east of Santa Rosa. A son of Mr. WEEKS discovered the coal on the 15th instant, and two or three men have been at work prospecting the vein since. The outcropping by which it was discovered was, say an inch in width. Shafts are now down ten feet, and the vein has widened to about twelve inches. It is the opinion of Mr. KENNEDY, a Mount Diablo coal miner, who is assisting to prospect it, that the indications of an extensive deposit are very strong, and he says it is, beyond dispute, the best quality of coal ever found in the State. There have been coal excitements in this country several times, but the coal and the excitement passed away simultaneously.

Colorado.

FROM THE *Miner* OF OCTOBER 5th.

WE have to record still another new discovery on McClellan mountain. This time the fortunate ones are THOMAS ENNIS and GEORGE HOLDEN. They have named their lode the HOLDEN. The surface ore, 1400 lbs. by mill treatment, yielded, the first class 636 ozs. per ton, and the second class 159 ozs. per ton.

Leavenworth mountain is yielding an immense quantity of rich ore. Every miner who has leased mines on tribute, on this mountain, wears a smiling face and looks jolly. THOMPSON & Co. are digging out float ore in considerable quantities and making a better per diem than Congressmen. The mineral, from four to five tons, this company have dug out runs 600 ozs. per ton.

PALMER & NICHOLS have shipped since our last issue, brick No. 402, 1495 ozs. 777 fine, $1502,23 coin; brick No. 403, 1515,50 ozs. 888 fine, $1739,75 coin, and brick No. 404, 1507,60 ozs. 840 fine, $1637,40 coin. A number of lots of ore were purchased by PALMER & NICHOLS during the past week, among which we notice a lot of Equator dump pile ore 172 ozs., and a lot from the mine 602 ozs.

The crushing and sampling works of the Trenton Gold and Silver Mining Company, at Silver Plume, is running on rich ore from the Stevens, Pelican, Silver Plume and Snowdrift. Our miners will be pleased to know that GEORGE E. H. GRAY Esq., of Silver Plume will make advances of money on good shipping ore. He will also if desired crush, sample, sack and ship ore on account of owners. The public will find Mr. Gray a reliable business man.

We have before us a certificate of assay signed by JACOB F. S. SCHIRMER, the superintendent of the United States Mint, Denver, showing that the Minneapolis ore carries 1749.9 ozs., equal to $2274, 87 in silver per ton. Gen. FRANK J. MARSHALL, for whom the assay was made, assures us that it was from average crevice material. McClellan and Kelso mountains still continue to attract the attention of large numbers of intelligent prospectors.

SUMMIT COUNTY.

While scampering over the mountains of Summit county a short time since, we again visited the Chautanqua, Glazier mountain, Snake River district. At our previous visit the discovery shaft was 40 feet deep. It is now 60 feet deep. The improvement in the quality and quantity of the ore as depth is gained, is marked and encouraging. A critical examination of the crevice material on the dump will convince any one that the Chautanqua is capable of yielding large quantities of good milling ore. Gray copper and galena are the predominating minerals. The gangue is gray quartz and baryta. If the mine continues to improve as it has since it first opened, and we have no doubt it will, Summit county will claim credit for having one of the richest silver mines in the world. Mr. G. H. BALL, the discoverer of this mine showed us one of the most beautiful specimens of native silver taken from the Chautanqua we have ever seen.

SILVER WING.

This mine, the property of the St. Lawrence Silver Mining Company is rapidly assuming the character of a first class mine. The ore vein is large and the indications are that a rich body of milling ore will soon be reached. The reduction works of this company are in a forward state of completion, and we hope to be able to note the shipment of the first silver brick from these works at an early day.

From the *Herald* of October 2d.

An examination of the record of assays made in the Territorial assay office, from Clear Creek county and from Grand Island district, from January 1 to September 15, 1871, gives the following results:

In this time 76 assays were made of ore samples from

fifty tons of ore. It is considered a true fissure vein, and the ore is of ample value to ship to England. The vein is now five feet wide. An extension has been taken up and both locations are likely to prove valuable.

We are indebted to the same paper (*Scientific Press*) for the following interesting report on the

SHELL CREEK MINES,

contained in a correspondence, dated Shellburn, September 13:

The trip from Hamilton to this place I will not describe, for the road is the same as every one has seen who has had occasion to travel in Nevada—a succession of mountain ranges and sage-brush plains. After twelve hours' ride from Hamilton, a distance of seventy-five miles, we arrived at Schelburn, the principal camp of the Schell Creek miners, situated at the western base of the mountains. The extensive adobe buildings of the old Overland Stage Co. are in a state of partial decay, giving the place the appearance of some deserted Spanish town, Schellburn contains at present three boarding-houses two groceries, one lodging house and three saloons. The population of the district is about two hundred and fifty, scattered over twenty miles of country.

Owing to the great extent of the Schell Creek mineral belt it is somewhat difficult to describe its geological character except in detail. The whole western base of the range to within a short distance of the main mineral belt, is evidently of volcanic origin, and consists of various species of trappean and basaltic, rocks sometimes occurring in dykes but more frequently in masses. In many cases there has been an overflow of the molten matter ejected from these fissures and openings; this is evident from the fact that in places where the basaltic covering is worn away, patches of the underlying porphyry are exposed. Very little upheaval of the surrounding strata has attended the eruption of these trappean rocks; a marked change however has taken place in the sedimentary rocks for a long distance from their front point of contact, no evidence of their former character remaining, except the stratification.

Another marked feature of the district the occurrence of Magnesian lime in contact with the richest portions of the main mineral belt, and its absence along the poorer part. In the northern part of the district this lime (evidently belonging to the Silurian age,) rests on granite, but as we go south along the east side of the range we find a thick bed of quartzite underlying the lime, and finally the shales and schists of the Cambrian Series underlying the quartzite. Some fine looking, well defined lodes have been found in these lower stratified rocks, and the indications are good for valuable mines. The main mineral belt follows the crest of the range for a distance of from eighteen to twenty miles, and can be easily traced with but two intervening breaks for the entire distance, but the rich mineral portion is confined to three quite limited localities known as the Northern mines, situated to the north of the overland road, the Queen Spring mines three miles south of the road, and the Ruby Hill mines eight miles further south. For convenience I will describe each locality separately.

NORTHERN MINES.

The formation containing the ledges in this part of the district is dolomite, overlying granite. The strata are nearly horizontal, having a slight dip to the east of only about eight degrees. The tilting of the strata here is evidently caused by the upheaval of the volcanic rocks on the west side of the range. The dolomite so far as I could discover, is entirely destitute of organic remains, if they ever existed, intense metamorphic action has evidently obliterated all traces of them. The shale, in places overlying the main belt, is said to contain a few fossils, and some specimens shown me evidently belonged to the orthis.

The McMahon mine is situated near the canon on the west side of the main range, and is very conveniently located for cheap working. The vein or deposit is about twelve feet in thickness, and can be traced on the surface for some distance north of the works. One half of the vein is supposed to be pay ore, some of which is quite rich. A few tons worked at the Big Smoky Mill, Hamilton, yielded $300 per ton, but probably the average of the paying part of the vein would not exceed $60 per ton. The vein is wholly in the dolomite. The ore is copper glance, sulphite of silver and horn-silver. About 300 yards northeast of the McMahon, near the summit, is situated the

SUMMIT MINE.

This is an immense mass of croppings about 600 feet in length by fifty in thickness. It lies on the dolomite with a thin bed of shale underlying quartzite above it, and has every appearance of being a contact vein, and in fact the same may be said of the whole main belt, but in this formation appearances are too deceptive for one to hazard an opinion. Much of the ore is rich; one ton worked at the Big Smoky Mill yielded $390 per ton, but the value of the mine consists in the quantity of low grade ore exposed in the croppings. The ore is mostly a free sulphide of silver distributed very evenly through a quartzose gangue.

THE WOODBURN

is situated to the south of the summit and is supposed to be an extension of the last-named mine. The vein is about six feet thick and traceable to the surface for two hundred feet. Like the McMahon, it lies wholly in the dolomite and carries the same character of mineral; it differs from the main belt in being more cupriferous. The ore is very evenly distributed through the ore, and is of good grade. To the north of this a vein called the Midas was discovered, carrying considerable gold. It made quite a stir at the time, and every boulder in the vicinity was located, but I have heard nothing of it lately. There are many other locations in this part of the district, some of them showing favorably, but there is nothing done towards their development, and we can form no estimate of their importance.

QUEEN SPRINGS.

This portion of the district is separated from the northern by a hill of porphyry two and a half miles in length. This porphyry is traversed by dykes and masses of greenstone, but so far as known is entirely destitute of mineral-bearing lodes.

South of this hill, across Queen Spring Canon, the dolomite again makes its appearance on the east side of the range, and with it the mineral belt. The dolomite in this part of the district dips to the west at an angle of thirty degrees, and forms the foot-wall of the vein, the hanging or western wall being quartzite. The croppings here are very large, varying from 50 to 150 feet in thickness, and the rich mineral portion has a length of about one mile. Rich chimneys of ore come to the surface in a number of places along these croppings, and each of them have been located as a separate ledge, consequently some of the titles must conflict. The

CAPITAN AND SILVER CHARIOT

are located at the north end of this belt one immense mass of croppings standing from twenty to thirty feet above the surface, and 600 feet in length, by 50 feet in thickness. The largest part of the outcrop is rather poor in mineral. The Silver Chariot, however, shows well in horn silver, and has worked $188 per ton at the Big Smoky mill.

SWEEPSTAKES

next south, has a good prospect for a large body of fair milling ore.

THE NUTMEG,

situated near the south end of this belt, is one of the most promising mines in this part of the district, and the owners, though poor men, are showing their faith in the value of the property by doing all they can to aid in its development.

THE SAN FRANCISCO

is situated to the east in the dolomite, and shows the same character of ore as the corresponding mines in the northern part of the district. South of Queen Spring Hill the dolomite gradually loses its magnesian character, and passes into a dark stratified lime resembling shale in appearance, and the accompanying quartz belt becomes gradually poor in silver, until near Ruby Hill, eight miles south of the last-named mines, the true dolomite again makes its appearance, and with it rich masses of silver ore. In this part of the district a mass of eruptive granite has divided the ledge into two veins, or two branches of the same vein, for more than one mile in length; one branch follows the dolomite along the east side of the granite, and the other the west side. On this last branch are located the most prominent mines in this part of the district, consisting in part of the following locations: Cow and Calf, Silver Wreath, Rambler's Luck, Lookout, and Rattler's Joy. These mines are considered the best in the district, and the large masses of high grade ore exposed in the croppings fully warrant the opinion. It is only a few weeks since the first discoveries were made in this part of the district, consequently the owners have had but little time to devote to the development of their property; but there is as much good ore in sight at present as White Pine could show under the circumstances. The ore in these ledges contains in addition to free sulphides, horn, silver and ruby silver. Assays run high into the thousands, and considerable of the ore on the dumps will certainly work well into hundreds. Taking it altogether, this is one of the most extensive mineral belts in Eastern Nevada, as well as one of the most promising, but capital is required for the development of the mines, as well as the erecting of mills for the reduction of the ore. This is not a poor man's country any more than other silver mining regions, and it is to be hoped that no one will be deluded into joining the great army of restless spirits in this State, who appear to be doomed like the Wandering Jew to keep forever marching on.

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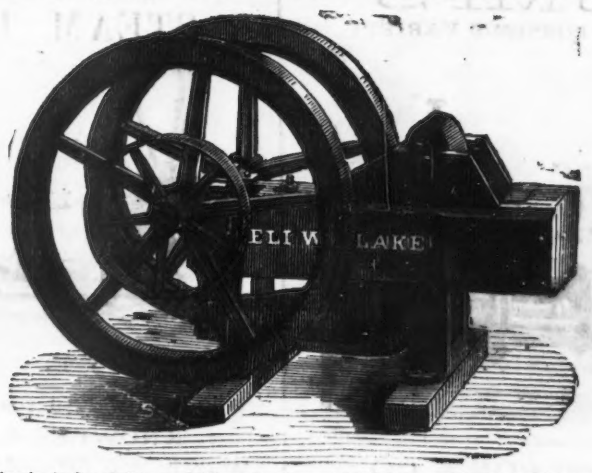

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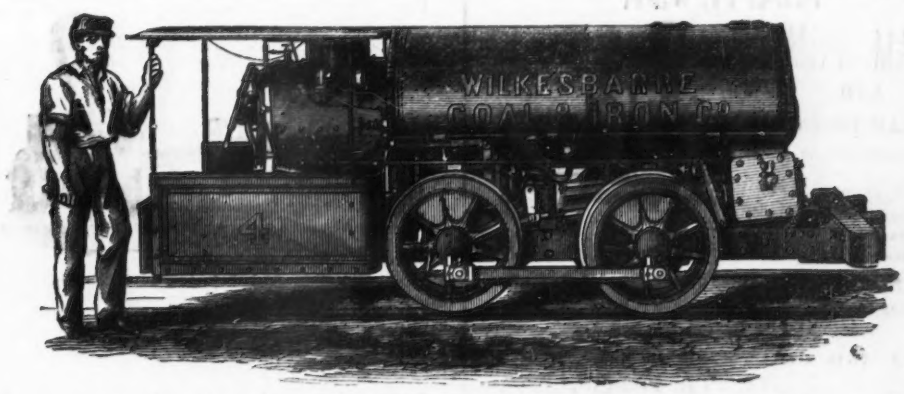

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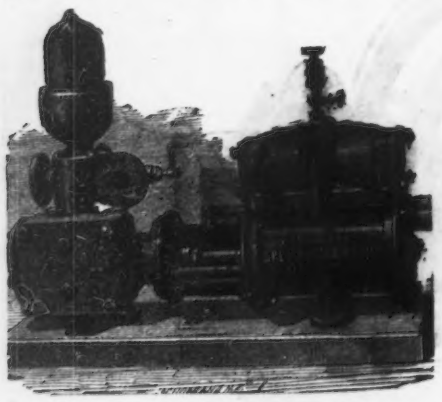

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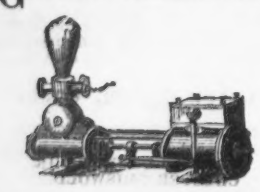

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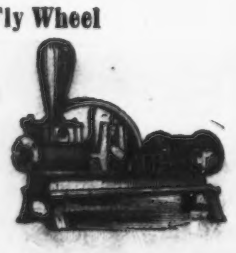

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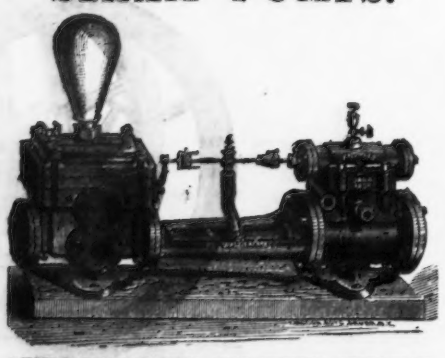

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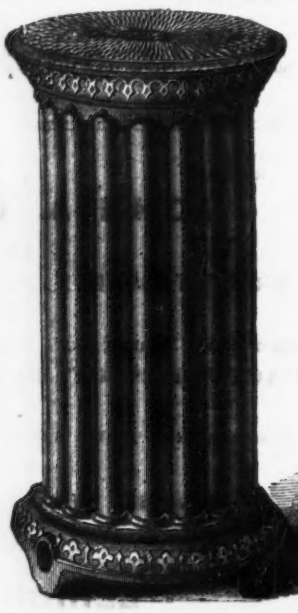

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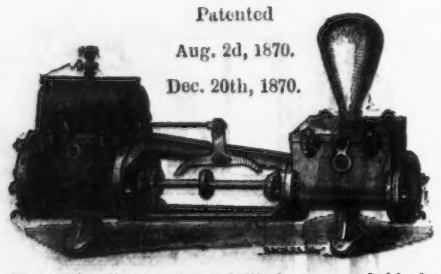

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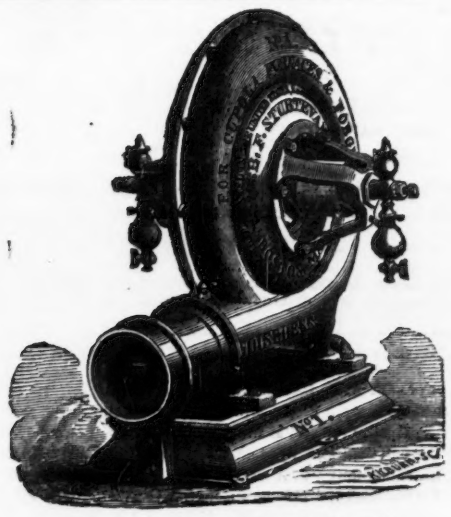

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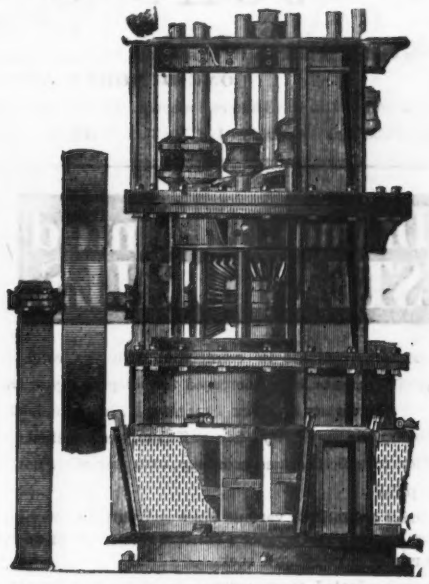

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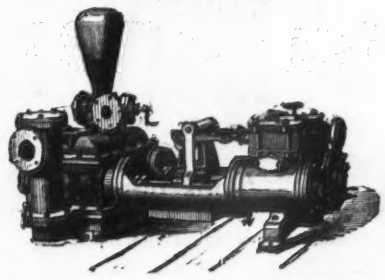

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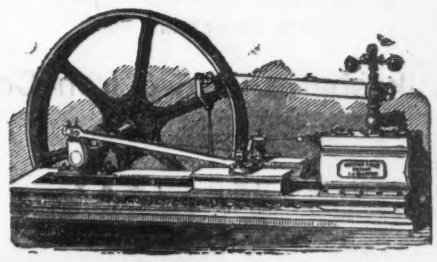

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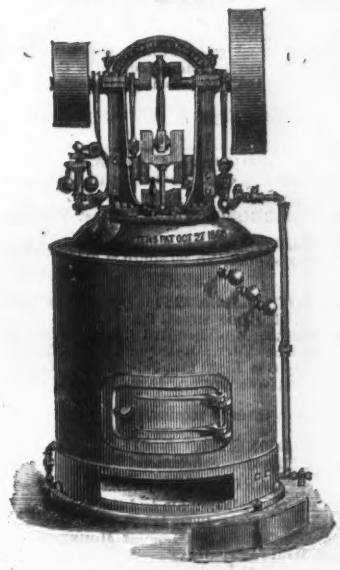

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